

APPENDIX A
SUPPORTING DATA FOR
ANALYSIS OF NPL SITES

Exhibit A-1: Number of NPL Source Control RODs by Type

Fiscal Year	Source Control				Other Remedies	Total RODs
	Some Treatment (% of Source Control RODS)	Containment or Disposal Only (% of Source Control RODS)	Other Source Control	Total Source Control		
1982	1 (25%)	3 (75%)	--	4	--	4
1983	0	7 (100%)	--	7	6	13
1984	5 (29%)	12 (71%)	0	17	21	38
1985	16 (28%)	34 (60%)	7	57	11	68
1986	27 (44%)	34 (56%)	0	61	24	85
1987	28 (50%)	28 (50%)	0	56	23	79
1988	72 (72%)	28 (28%)	0	100	52	152
1989	76 (74%)	29 (28%)	0	105	41	146
1990	88 (70%)	35 (28%)	2	125	45	170
1991	105 (74%)	34 (24%)	2	141	57	198
1992	86 (72%)	26 (22%)	7	119	54	173
1993	84 (71%)	31 (26%)	4	119	71	190
1994	58 (59%)	35 (36%)	5	98	67	165
1995	62 (53%)	48 (41%)	7	117	71	188
Totals	708 (63%)	384 (34%)	34	1,126	543	1,669

Notes:

- RODs denote Records of Decision.
- "Other Source Control" includes RODs calling for only institutional controls, monitoring, and relocation remedies.
- "Other Remedies" include RODs calling for "groundwater only" remedies and "no action."
- Numbers in italics are preliminary.

Exhibit A-2: Representative Hazardous Chemicals by Contaminant Group

The hazardous chemicals listed below are representative of those found at National Priorities List (NPL) sites. The list is developed from site assessment information for NPL sites without Records of Decision (RODs), based on the *Test Methods for Evaluating Solid Waste, Volume 1A: Laboratory Manual, Physical/Chemical Methods*, Third Edition, Proposal Update II, PB94-170321, November 1992. These chemicals represent many, but not all, of the contaminants found at NPL sites.

Volatile Organic Compounds (VOCs)	
1,1,1-Trichloroethane	Dibromochloromethane
1,1,2,2-Tetrachloroethane	Dibromochloropropane (DBCP)
1,1,2-Trichloroethane	Dibromomethane
1,1-Dichloroethane	Dichlorodifluoromethane
1,1-Dichloroethene	Dichloroethylene
1,1-Dichloropropylene	Dichloromethane
1,2,3-Trichloropropane	Dichloropropene
1,2-Dichloroethane	Ethyl Ether
1,2-Dichloroethene	Ethyl Methacrylate
1,2-Dichloropropane	Ethylbenzene
1,2-Transdichloroethene	Iodomethane
1,3-Dichloropropane	Isopropanol
1,3-Trichloropropene	M-PSA
1,4-Dichloro-2-butene	M-Xylene
2-Butanone (MEK)	Methane
2-Chloroethyl Vinyl Ether	Methanethiol
2-Chloropropane	Methylene
2-Hexanone	Methylene Chloride
3-Hexanone	O-Xylene
4-Methyl-2-pentanone	P-PSA
Acetone	P-Xylene
Acrolein	Polyvinyl Chloride
Acrylonitrile	Styrene
Benzene	Tetrachloroethene
Bromodichloromethane	Tetrachloroethylene
Bromodichloroethane	Tetrahydrofuran
Bromoform	Toluene
Bromomethane	Total Xylenes
Carbon Disulfide	Trans-1, 2-dichloroethene
Carbon Tetrachloride	Trans-1,3-dichloropropene
Chlorobenzene	Trichloroethene
Chloroethane	Trichlorofluoromethane
Chloroform	Vinyl Acetate
Chloromethane	Vinyl Chloride
Cis-1,2-Dichloroethane	Vinylidene Chloride
Cis-1,2-Dichloroethylene	Volatile Organics
Cis-1,3-Dichloropropene	

Exhibit A-2: Representative Hazardous Chemicals by Contaminant Group (Continued)

Semivolatile Organic Compounds (SVOCs)	
(Lindane) Gamma-BHC 1,2,3-Trichlorobenzene 1,2,4,5-Tetrachlorobenzene 1,2,4-Trichlorobenzene 1,2-Dichlorobenzene 1,2-Diphenylhydrazine 1,3-Dichlorobenzene 1,4-Dichlorobenzene 1-Chloroaniline 1-Naphthylamine 2,2-Dichlorobenzidine 2,3,4,5-Tetrachlorophenol 2,4,5-Trichlorophenol 2,4,6-Trichlorophenol 2,4-Dichlorophenol 2,4-Dichlorotoluene 2,4-Dimethylphenol 2,4-Dinitrophenol 2,4-Dinitrotoluene 2,6-Dichlorophenol 2,6-Dinitrotoluene 2-Chloronaphthalene 2-Chlorophenol 2-Mercaptan-Benzothiazole 2-Methyl-4,6-Dinitrophenol 2-Methylnaphthalene 2-Methylphenol 2-Naphthylamine 2-Nitroaniline 2-Nitrophenol 2-Picoline 3-Methylcholanthrene 3-Methylphenol 3-Nitroaniline 4,4-DDD 4,4-DDE 4,4-DDT 4,6-Dinitro-o-cresol 4-Aminobiphenyl 4-Bromophenyl Phenyl Ether 4-Chloro-3-methylphenol 4-Chloroaniline 4-Chlorophenyl Phenyl Ether 4-Methylphenol 4-Nitroaniline 4-Nitrophenol 7,12-Dimethylbenz(a)anthracene A,A-Dimethyl-b-phenylethylamine Acenanthrene	Acenaphthene Acenaphthylene Acetophenone Aldrin Alpha-BHC Amiben Aniline Anthracene Benzidine Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluorathene Benzo (ghi)perylene Benzo(k)fluoranthene Benzo(j)fluorathene Benzo(k)pyrene Benzoic Acid Benzothiazole Benzyl Alcohol Bis(2-chloroethoxy)methane Bis(2-chloroethyl)ether Bis(ethylhexyl)phthalate Bis-2-chloroethoxyphthalate Butyl Benzyl Phthalate Chlordane Chrysene Cresote Delta-BHC DHD Di-n-octyl Phthalate Dibenzo(a,h)anthracene Dibenzofuran Dibutyl Phthalate Dimethyl Phthalate Dinitrophenol Dinoseb Diphenylamine DNB Endosulfan I Endosulfan II Endosulfan Sulfate Endrin Endrin Aldehyde EPTC Ethyl Methanesulfonate Ethylamylketone (EAK) Ethylene Dibromide Fluoranthene Fluorene

Exhibit A-2: Representative Hazardous Chemicals by Contaminant Group (Continued)

Semivolatile Organic Compounds (SVOCs) (Continued)	
Heptachlor Heptachlorepoxyde Herbicides Hexachlorobenzene Hexachlorobutadiene Hexachlorocyclohexan Hexachlorocyclopentadiene Hexachloroethane Hexadecanoic Acid Indeno(1,2,3-cd)pyrene Isophorone Kepone Malathion Methoxychlor Methyl Ethyl Benzene Methylmethanesulfonate N-Methylpyrrolidene N-Nitroso-di-n-butylamine N-Nitrosodimethylamine N-Nitrosopiperidine Naphthalene Nitrobenzene Oxazolidone	Parathion PCB Pentachlorobenzene Pentachloronitrobenzene Pentachlorophenol Pesticides Phenacetin Phenanthrene Phenol Phenothiazine Polynuclear Aromatic Hydrocarbons Pronamid Pyrene P-Dimethylaminoazobenzene Resorcinol Shell Sol 140 TDX Tertbutylmethylether Tetrahydrofuran TNB 1,3,5-Trinitrobenzene Toxaphene Vernolate

Metals	
Aluminum Antimony Arsenic Barium Beryllium Boron Cadmium Calcium Cesium Chrome Chromite Chromium Cobalt Copper Iron Lead Magnesium Manganese Mercury Metals	Molybdenum Nickel Plutonium Potassium Radium Selenium Silicon Silver Sodium Strontium Technetium Thallium Thorium Tin Titanium Tritium Uranium Vanadium Zinc Zirconium

**Exhibit A-3: Distribution of Quantities of Contaminated Soil,
Sediment, and Sludge at NPL Sites With RODs**

Quantity Estimate (Cubic Yards)	Number of NPL Sites with Data By Matrix					
	Soil		Sediment		Sludge	
	Federal Facilities	Non-Fed. Facilities	Federal Facilities	Non-Fed. Facilities	Federal Facilities	Non-Fed. Facilities
<1,000	3	47	0	16	0	6
1,000 - 5,000	6	65	1	16	0	7
5,001 - 10,000	6	46	1	10	0	4
10,001 - 30,000	7	83	1	8	0	8
30,001 - 50,000	5	42	1	8	1	10
50,001 - 100,000	1	32	0	5	0	7
>100,000	6	55	1	6	2	6
Total Number of Sites	34	370	5	69	3	48
Note: Data are derived from 510 Records of Decision (RODs) for 430 sites with data.						
Source: U.S. EPA, Office of Emergency and Remedial Response, ROD Information Directory, December 1995.						

**Exhibit A-4: Estimated Quantity of Contaminated Soil, Sediment, and Sludge
for Major Contaminant Groups at Non-Federal NPL Sites with Planned Remedial Actions**

(1)	(2)	(3)	(4)	(5)
Contaminant Subgroup	Number of NPL Sites With Available Data ^a	Average Based on Available Data (Cubic Yards) ^a	Numbers of NPL Sites With Planned Remedial Action ^b	Projected Total Quantity (Cubic Yards) ^c
Single:				
Metals	68	93,000	49	4,557,000
VOCs	35	19,000	60	1,140,000
SVOCs	77	23,000	26	598,000
Others	14	71,000	53	3,763,000
Double:				
VOCs & Metals	49	56,000	54	3,024,000
SVOCs & Metals	16	40,000	29	1,160,000
VOCs & SVOCs	32	69,000	52	3,588,000
VOCs, SVOCs, & Metals	129	68,000	224	15,232,000
TOTALS	420		547	33,062,000

Notes:

^a Source of quantity data is U.S. EPA, RODs, fiscal years 1982-1994. Statistical outliers are not included. Site-specific data are not available for quantities of material to be remediated at all sites with planned remedial actions; these values are derived from estimates contained in the RODs for 420 sites containing similar contaminants.

^b Based on the distribution of contaminant groups among the 944 sites with ROD data shown in Exhibit 3-4. Each site is placed in one subgroup only.

^c The total for each subgroup is calculated by multiplying columns (3) and (4). Projected quantities are rounded.

APPENDIX B

SUPPORTING DATA FOR ANALYSIS OF

UNDERGROUND STORAGE TANK SITES

Exhibit B-1: Location of Registered USTs in the United States

Region	State	Number of Active Tanks	Number of Closed Tanks	Number of Confirmed Releases	Cleanups Initiated or Completed
One	CT	21,539	16,481	1,564	2,509
	MA	20,451	15,602	4,517	6,177
	ME	12,390	7,940	1,415	2,755
	NH	5,913	10,823	1,589	2,285
	RI	6,659	7,791	859	1,412
	VT	3,058	3,566	1,374	2,056
	Subtotal	70,010	62,203	11,318	17,194
Two	NJ	29,029	34,671	6,136	8,332
	NY	44,730	44,612	13,114	21,031
	PR	7,855	2,481	464	509
	VI	305	72	21	28
	Subtotal	81,919	81,836	19,735	29,900
Three	DC	1,045	2,503	736	1,160
	DE	2,578	5,024	2,271	3,473
	MD	17,940	15,687	12,831	16,565
	PA	41,305	35,444	7,286	7,980
	VA	40,309	29,442	7,775	13,943
	WV	8,530	13,926	1,945	2,144
	Subtotal	111,707	102,026	32,844	45,265
Four	AL	21,968	20,287	8,292	13,005
	FL	41,984	74,059	25,746	7,848
	GA	49,380	15,770	6,520	8,000
	KY	20,280	19,759	6,354	11,661
	MS	11,420	17,172	4,546	8,621
	NC	42,505	52,804	18,696	29,959
	SC	18,897	22,236	4,311	2,998
	TN	27,527	25,668	8,567	14,768
	Subtotal	233,961	247,755	83,032	96,860
Five	IL	48,407	25,757	14,073	18,222
	IN	20,131	28,269	5,151	5,354
	MI	33,880	47,451	14,456	19,166
	MN	20,712	16,989	5,925	9,164
	OH	31,760	26,510	7,488	16,228
	WI	25,724	48,311	13,742	19,668
	Subtotal	180,614	193,287	60,835	87,802

Exhibit B-1: Location of Registered USTs in the United States (continued)

Region	State	Number of Active Tanks	Number of Closed Tanks	Number of Confirmed Releases	Cleanups Initiated or Completed
Six	AR	20,796	4,923	599	873
	LA	23,207	16,665	2,301	2,651
	NM	5,187	6,562	1,822	2,256
	OK	16,460	16,217	3,021	4,330
	TX	81,239	74,787	19,556	20,446
	Subtotal	146,889	119,154	27,299	30,556
Seven	IA	10,715	18,700	5,038	4,829
	KS	10,302	15,497	4,232	5,205
	MO	20,271	20,799	4,288	6,884
	NE	9,545	9,065	3,868	2,781
	Subtotal	50,833	64,061	17,426	19,699
Eight	CO	11,933	12,916	3,215	4,921
	MT	5,715	8,911	2,839	4,402
	ND	3,539	5,282	721	1,100
	SD	3,846	4,136	1,703	2,563
	UT	5,186	9,755	2,798	4,321
	WY	2,570	6,552	1,739	1,049
	Subtotal	32,789	47,552	13,015	18,356
Nine	AZ	9,489	15,488	6,157	5,991
	CA	97,623	70,886	29,824	34,370
	HI	4,053	2,917	916	816
	NV	5,836	5,963	1,839	3,136
	CQ	78	9	6	4
	GU	577	226	93	204
	SA	46	11	1	1
	Subtotal	117,702	95,500	38,836	44,522
Ten	AK	2,665	4,551	1,302	1,698
	ID	5,295	6,779	1,019	1,619
	OR	10,990	19,387	5,100	4,885
	WA	14,750	27,226	4,789	6,012
	Subtotal	33,700	57,943	12,210	14,214
Indian Lands	Subtotal	4,354	2,705	938	930
Nation-Wide	TOTAL	1,064,478	1,074,022	317,488	405,298

Source: U.S. EPA, Office of Underground Storage Tanks, Semi-Annual Activity Report, Second Half (September 30) FY 1996.

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APPENDIX C

SUPPORTING DATA FOR

ANALYSIS OF DOD SITES

Exhibit C-1: Location of DOD Sites Needing Cleanup

EPA Region	State	DOD Installations	DOD Sites	Army Sites	Navy Sites	AF Sites	DLA Sites	FUDS Sites
One	CT	7	36	3	30	2	0	1
	MA	51	158	56	14	47	0	41
	ME	25	69	0	22	22	0	25
	NH	6	18	0	0	14	0	4
	RI	15	50	3	31	0	0	16
	VT	1	1	0	0	0	0	1
	Subtotal	105	332	62	97	85	0	88
Two	NJ	34	117	44	35	8	0	30
	NY	97	269	76	8	78	0	107
	PR	13	40	0	27	1	0	12
	VI	0	0	0	0	0	0	0
	Subtotal	144	426	120	70	87	0	149
Three	DC	9	27	0	18	6	0	3
	DE	8	30	0	0	19	0	11
	MD	33	434	270	127	20	1	16
	PA	44	183	75	38	7	41	22
	VA	35	306	77	185	22	9	13
	WV	7	31	1	12	6	0	12
	Subtotal	136	1,011	423	380	80	51	77
Four	AL	17	205	166	0	28	0	11
	FL	75	390	0	211	112	0	67
	GA	23	221	149	26	36	0	10
	KY	7	66	62	2	1	0	1
	MS	26	56	0	14	19	0	23
	NC	18	175	24	121	17	0	13
	SC	21	247	29	152	55	0	11
	TN	13	175	37	57	13	65	3
	Subtotal	200	1,535	467	583	281	65	139
Five	IL	36	196	116	34	19	0	27
	IN	10	89	42	32	10	0	5
	MI	36	118	35	0	56	0	27
	MN	10	29	15	5	5	0	4
	OH	27	107	1	0	69	12	25
	WI	15	36	10	0	16	0	10
	Subtotal	134	575	219	71	175	12	98

Exhibit C-1: Location of DOD Sites Needing Cleanup (continued)

EPA Region	State	DOD Installations	DOD Sites	Army Sites	Navy Sites	AF Sites	DLA Sites	FUDS Sites
Six	AR	8	27	8	0	14	0	5
	LA	10	40	16	12	8	0	4
	NM	57	104	27	0	17	0	60
	OK	25	75	19	0	35	0	21
	TX	81	344	108	83	82	0	71
	Subtotal	181	590	178	95	156	0	161
Seven	IA	8	49	39	0	4	0	6
	KS	53	176	105	0	9	0	62
	MO	21	72	44	0	8	0	20
	NE	29	100	64	2	6	0	28
	Subtotal	111	397	252	2	27	0	116
Eight	CO	14	285	216	0	62	0	7
	MT	10	20	0	0	12	0	8
	ND	4	10	5	0	4	0	1
	SD	16	33	0	0	19	0	14
	UT	11	277	230	0	37	0	10
	WY	5	16	0	0	12	0	4
	Subtotal	60	641	451	0	146	0	44
Nine	AZ	37	172	99	10	34	0	29
	CA	220	1,851	103	916	612	64	156
	HI	50	133	15	46	43	0	29
	NV	20	56	29	2	8	0	17
	PI ^a	10 ^a	19 ^a	0	0	9	0	10
	GU	9	90	0	51	37	0	2
	SA	0	0	0	0	0	0	0
	Subtotal	346	2,321	246	1,025	743	64	243
Ten	AK	95	416	48	89	214	0	65
	ID	4	4	0	1	0	0	3
	OR	17	32	2	0	13	0	17
	WA	28	56	10	24	13	0	9
	Subtotal	144	508	60	114	240	0	94
Nation-Wide	TOTAL	1,561	8,336	2,478	2,437	2,020	192	1,209

Notes: PI = Pacific Islands: Johnston Atoll, Mariana Island, Midway, Palau, and Wake Island.

Source: DOD, Office of the Deputy Under Secretary (Environmental Security), Restoration Management Information System, November, 1995. Data as of September 1995.

Exhibit C-2: Definitions of DOD Site Types

Site Type	Site Description	Primary Contaminants
Underground Storage Tank	Underground storage tank sites result from the release of substances from underground storage tanks and any associated piping.	<ul style="list-style-type: none"> • POLs • POL sludges • Solvents • Metals
Spill Area	Spill areas are small areas where spills from drums, tanks, and other waste units have taken place.	<ul style="list-style-type: none"> • POLs • PCBs • Solvents • POL sludge • Metals
Landfill	Landfill sites are typically areas formerly used to dispose of both domestic and industrial hazardous waste.	<ul style="list-style-type: none"> • POLs • Solvents • Paint • Pesticides • Metals • Ord. compounds
Unexploded Munitions/Ordnance Area	Unexploded munitions and ordnance areas are areas that have been used for munitions and ordnance training.	<ul style="list-style-type: none"> • UXO • Metals • Explosive chemicals • Ord. compounds
Surface Disposal Area	Surface disposal area sites consist of small areas formerly used for disposal of solid wastes with little or no free liquids. Typical materials include rags, filters, paint cans, small capacitors, and batteries.	<ul style="list-style-type: none"> • POLs • Solvents • Paints • Pesticides • Metals • Acids • PCBs
Disposal Pit/Dry Well	Disposal pit/dry well sites consist of small unlined excavations and structures that were used over a period of time to dispose of small quantities of liquid wastes.	<ul style="list-style-type: none"> • POLs (for example, motor oil) • Acids (for example, battery acid) • Ordnance compounds • Explosive chemicals • Metals • Solvents
Storage Area	Storage areas are areas where spills and leaks occurred from stored containers or equipment.	<ul style="list-style-type: none"> • POLs • Solvents • POL sludge • Metals • Acid • PCBs
Contaminated Groundwater	Contaminated groundwater results from various types of releases of known or unknown origin, such as migration of leachate from disposal areas and migration of substances from contaminated surface and subsurface soils.	<ul style="list-style-type: none"> • Metals • Chlorinated solvents • Explosive chemicals • Non-chlorinated solvents • POLs

Exhibit C-2: Definitions of DOD Site Types

Site Type	Site Description	Primary Contaminants
Fire/Crash Training Area	Fire and crash rescue training areas consist of trenches and/or pits where flammable materials were ignited periodically for demonstrations and training exercises.	<ul style="list-style-type: none"> • POLs • Solvents • POL sludges • Metals
Building Demolition/Debris Removal	Building demolition and debris removal sites consist of buildings and/or debris that are unsafe or must be removed.	<ul style="list-style-type: none"> • Asbestos • Construction debris • Lead paint
Surface Impoundment/Lagoon	Surface impoundments and lagoons consist of unlined depressions, excavations, or diked areas which were used to accumulate liquid waste, waste containing free liquid, or industrial wastewaters.	<ul style="list-style-type: none"> • POLs • Solvents • Explosive chemicals • Industrial wastewater • Metals • Ord. compounds
Aboveground Storage Tanks	Aboveground storage tank sites result from release of substances to surrounding areas from above ground tanks, containers, and any associated piping.	<ul style="list-style-type: none"> • POLs (for example, heating oil, jet fuel, gasoline, and POL sludges)
Contaminated Fill	Contaminated fill areas consist of contaminated material resulting from excavations for construction, tanks, and other purposes.	<ul style="list-style-type: none"> • POLs • Metals • Ordnance compounds • Explosive chem. • Paint waste
Contaminated Building	Contaminated building sites result from releases within or on the outside of a structure of a substance that has been contained within the building.	<ul style="list-style-type: none"> • POL • Plating waste • Metals • POL sludge • Polychlorinated biphenyls (PCBs) • Asbestos • Propellants • Pesticides • Solvents • Acids
Burn Area	Burn area sites consist of pits or surface areas that were used for open-air incineration of waste.	<ul style="list-style-type: none"> • POLs (e.g., spent motor oil, jet fuel) • Solvents (e.g., spent paint thinners and degreasing agents) • Explosives • Propellants • Ordnance
Contaminated Sediments	Contaminated sediments include sediments of bodies of water that have been contaminated by surface runoff, subsurface migration, or direct discharge of contaminants.	<ul style="list-style-type: none"> • POLs • PCBs • Pesticides • Metals • Solvents • Explosive chem.

Exhibit C-2: Definitions of DOD Site Types (continued)

Site Type	Site Description	Primary Contaminants
Explosive/Ordnance Disposal Area	Explosive ordnance disposal areas consist of open-air areas that were used to detonate, demilitarize, bury, or dispose of explosives.	<ul style="list-style-type: none"> • Unexploded ordnance (UXO) • Metals • Ordnance compounds • Explosive chemicals
Waste Line	Waste lines are underground piping used to carry industrial wastes from shop facilities to a wastewater treatment plant.	<ul style="list-style-type: none"> • Solvents • Metals • Plating sludges • Pesticides • Explosive chemicals
Waste Treatment Plant	Wastewater treatment plant sites result from releases of substances at plants that were used to treat and dispose of domestic and/or industrial wastewater.	<ul style="list-style-type: none"> • POLs • Industrial wastewater • Solvents • Plating sludges • Explosive chemicals
Sewage Treatment Plant	Sewage treatment plants typically consist of a complex of tanks, piping, and sludge management areas used to treat sanitary sewage generated at an installation. The unit may use chemical or biological treatment methods. Lagoons associated with the biological treatment of sewage currently may be considered to be separate units.	<ul style="list-style-type: none"> • Metals • Industrial wastewater • Solvents • POLs
Petroleum, Oil, Lubricant (POL) Distribution Line	Petroleum, oil, lubricant distribution lines are used to transport POL products from storage to dispensing facilities.	<ul style="list-style-type: none"> • POLs (for example, heating oil, gasoline, Jet A, diesel, and other fuels) • POL sludge
Underground Storage Tank Farm	Underground storage tank farm sites result from the release of substances from multiple, typically large, underground storage tanks and associated piping which make up a tank farm complex.	<ul style="list-style-type: none"> • POLs • Solvents • POL sludges • Metals
Firing Range	Firing ranges consist of large areas of land used for practice firing of large artillery or mortars, or as a practice bombing range for aircraft. These areas are typically contaminated with unexploded ordnance, which may be found both on and below the ground surface.	<ul style="list-style-type: none"> • Metals • UXO • Ord. compounds • Explosives • Radionuclides
Soil Contaminated After Tank Removal	This unit consists of soil that has been removed during a tank removal operation and staged prior to treatment.	<ul style="list-style-type: none"> • POLs • POL sludge

Exhibit C-2: Definitions of DOD Site Types

Site Type	Site Description	Primary Contaminants
Storm Drain	Storm drains typically consist of a natural or man-made drain used as a runoff control structure for rainfall. The unit also may be used from runoff from other sources such as process operations. Man-made units may be concrete lined.	<ul style="list-style-type: none"> • POLs • Metals • POL sludge • Pesticides • Industrial wastewater • Solvents
Oil/Water Separator	Oil/water separators are typically small units that skim oil from storm water runoff. The oil/water separator consists of the unit, and any associated piping.	<ul style="list-style-type: none"> • POLs • Solvents • Industrial wastewater • PCBs
Maintenance Yard	Maintenance yards consist of paved or unpaved areas where vehicles and other maintenance equipment is stored and often serviced. Typically, maintenance supplies are stored at these units.	<ul style="list-style-type: none"> • POLs • Metals • Solvents
Low-level Radioactive Waste Area	Low-level radioactive waste areas consist of areas used to store or dispose of low-level radioactive materials of various types (for example, radium paint, and radioactive instruments and propellants).	<ul style="list-style-type: none"> • Low-level radioactive waste
Washrack	Washrack sites typically consist of a building designed for washing vehicles such as tanks, aircraft, and other military vehicles. This unit also may consist of a paved area where washing of vehicles occurs.	<ul style="list-style-type: none"> • POLs
Drainage Ditch	Drainage units typically consist of a natural or a man-made ditch used as a runoff control structure for rainfall. The unit also may be used for runoff from other sources such as process operations. Man-made units may be concrete lined.	<ul style="list-style-type: none"> • POLs • Explosive chemicals • Solvents • PCBs • Metals
Small Arms Range	Small arms ranges are typically located outdoors and used for target practice of small arms, usually 50 caliber or less. The unit may include a soil or sandbag berm, or hill located behind the targets to prevent bullets from travelling outside the range area.	<ul style="list-style-type: none"> • Metals • Ordnance compounds
Incinerator	Incinerators typically consist of a furnace and stack unit used for a variety of disposal activities including the incineration of medical waste, or an installation's dunnage. These units vary in size and may either be freestanding or part of other operations such as hospitals.	<ul style="list-style-type: none"> • Ash • Metals • Ordnance compounds

Exhibit C-2: Definitions of DOD Site Types (continued)

Site Type	Site Description	Primary Contaminants
Contaminated Soil Piles	This unit consists of soil that has been staged after an excavation activity.	<ul style="list-style-type: none"> • POLs • Sludge • Metals • Solvents • PCBs • Ordnance compounds
Mixed Waste Area	Mixed waste areas consist of areas used to store or dispose of hazardous wastes that have been mixed with or contaminated by radioisotopes.	<ul style="list-style-type: none"> • Solvents • Mixed waste
Pistol Range	Pistol ranges may be located indoors or outdoors and are used for target practice. Outdoor units include a soil or sandbag berm located behind the targets to prevent bullets from travelling outside the range area.	<ul style="list-style-type: none"> • Metals
Chemical Disposal	Chemical disposal units are areas that have been used for the disposal of chemicals, typically of an unknown type. The unit may be a burial area where bottles or packages of chemicals were placed or an area where liquids were disposed of on the soil.	<ul style="list-style-type: none"> • POLs • Metals • Solvents • Explosive chemicals
Pesticide Shop	Pesticide shops typically are used to store and prepare large volumes of pesticides and solvents for maintenance activities. The units may be located in a freestanding building or attached to another building. Areas near the unit may have been used for the disposal of off-specification pesticides.	<ul style="list-style-type: none"> • Pesticides • Metals • POLs
Industrial Discharge	Industrial discharge units consist of a pipe system used to discharge industrial effluent to the environment. The unit may discharge to a natural or man-made water body, dry creek bed or some other natural feature.	<ul style="list-style-type: none"> • Metals • Industrial wastewater
Surface Runoff	Surface runoff is an area with runoff from rain which may occur anywhere within a facility, particularly adjacent to industrial areas and airfield aprons.	<ul style="list-style-type: none"> • POLs • Metals • Solvents • Explosive chemicals
Leach Field	Leach fields typically consist of a subsurface area generally associated with septic tanks. The unit serves the purpose of biologically treating sanitary sewage, however, in cases where these units were used at industrial facilities, there also is contamination from non-biodegradable industrial contaminants.	<ul style="list-style-type: none"> • Metals • Solvents

Exhibit C-2: Definitions of DOD Site Types (continued)

Site Type	Site Description	Primary Contaminants
Plating Shop	Plating shops typically consist of a building or room within a building used for coating metal parts. The unit contains several tanks of solvents which are used in the plating process.	<ul style="list-style-type: none"> • Metals • Solvents • Acids • Industrial wastewater
Sewage Effluent Settling Pond	Sewage effluent settling ponds consist of a lagoon used for the settling of solids and/or biological treatment of sewage. The units also may be used as infiltration galleries.	<ul style="list-style-type: none"> • Metals • Ordnance compounds • Solvents
Dip Tank	Dip tanks are typically metal or concrete units located in coating shops that range in size from 50 to more than 500 gallons. The tanks are used to clean parts prior to treatment, or to coat parts with various materials including metals and plastics.	<ul style="list-style-type: none"> • POLs • Chlorinated solvents • Metals • Acids
Optical Shop	Optical shops typically consist of laboratory units located within a building. Activities include grinding lenses used in eye glasses or other optical instruments.	<ul style="list-style-type: none"> • Solvents
<p>Notes: POL = Petroleum, oil, and lubricants; PCB = Polychlorinated Biphenyls; Ord. = Ordnance</p> <p>Source: DOD, Office of the Deputy Under Secretary of Defense (Environmental Security), Defense Environmental Restoration Program Annual Report to Congress, for Fiscal Year 1995, Spring 1996.</p>		

Exhibit C-3: DOD Sites Needing Cleanup by Site Type

Site Type	Army	Navy	AF	DLA	FUDS	Total
Underground Storage Tanks	241	408	352	11	187	1,199
Spill Area	199	190	619	11	10	1,029
Landfill	353	255	293	5	34	940
Unexploded Munitions/Ordnance Area	53	28	17	0	398	496
Surface Disposal Area	161	356	155	3	25	700
Disposal Pit/Dry Well	185	76	201	39	34	535
Storage Area	201	298	25	32	13	569
Contaminated Groundwater	88	42	8	5	68	211
Fire/Crash Training Area	45	83	96	3	3	230
Building Demolition/Debris Removal	7	8	0	0	103	118
Surface Impoundment/Lagoon	138	63	5	9	8	223
Aboveground Storage Tanks	47	67	17	4	25	160
Contaminated Fill	27	12	5	10	63	117
Contaminated Building	114	35	1	14	7	171
Burn Area	102	40	4	7	4	157
Contaminated Sediments	53	66	10	0	15	144
Explosive/Ordnance Disposal Area	65	28	0	0	24	117
Waste Line	30	49	16	2	1	98
Waste Treatment Plant	41	26	13	0	1	81
Sewage Treatment Plant	13	0	64	1	3	81
Petroleum, Oil, Lubricant Distribution Line	12	41	18	2	2	75
Underground Storage Tank Farm	22	52	1	0	2	77
Firing Range	16	5	0	0	28	49
Soil Contaminated After Tank Removal	19	5	0	15	25	64
Storm Drain	6	7	21	3	0	37
Oil/Water Separator	28	28	6	1	0	63
Maintenance Yard	20	38	0	1	0	59
Low-level Radioactive Waste Area	4	3	12	0	2	21
Washrack	19	4	0	0	0	23
Drainage Ditch	21	15	0	2	0	38
Small Arms Range	7	3	0	0	8	18
Incinerator	21	5	0	0	0	26
Contaminated Soil Pipes	12	7	0	1	2	22

Exhibit C-3: DOD Site Types Needing Cleanup (continued)

Site Type	Army	Navy	AF	DLA	FUDS	Total
Mixed Waste Area	1	15	0	0	1	17
Pistol Range	5	7	0	2	0	14
Chemical Disposal	24	2	0	0	5	31
Pesticide Shop	8	9	0	4	0	21
Industrial Discharge	33	7	0	0	0	40
Surface Runoff	6	7	0	0	0	13
Leach Field	11	2	0	0	0	13
Plating Shop	0	9	0	0	0	9
Sewage Effluent Settling Pond	4	2	0	0	0	6
Dip Tank	1	4	0	1	0	6
Optical Shop	1	1	1	0	0	3
Other	14	29	60	4	108	215
Total	2,478	2,437	2,020	192	1,209	8,336

Source: DOD, Office of the Deputy Under Secretary of Defense (Environmental Security), Restoration Management Information System, 1996. Data as of September 1995.

Exhibit C-4: Frequency of Matrices by DOD Site Type

Site Type	No. of Sites with Data	Ground-water	Soil	Surface water	Sediment
Underground Storage Tanks	444	334	259	16	4
Spill Area	539	384	354	101	28
Landfill	491	386	305	172	38
Unexploded Munitions/Ordnance Area	14	6	11	4	1
Surface Disposal Area	347	228	251	85	17
Disposal Pit/Dry Well	334	276	253	63	27
Storage Area	181	92	152	25	10
Contaminated Groundwater	86	83	28	11	6
Fire/Crash Training Area	157	126	121	27	8
Building Demolition/Debris Removal	6	0	6	0	0
Surface Impoundment/Lagoon	93	60	56	32	15
Aboveground Storage Tanks	40	27	30	4	1
Contaminated Fill	37	22	31	8	2
Contaminated Building	37	14	32	3	8
Burn Area	78	50	53	13	9
Contaminated Sediments	49	23	33	17	9
Explosive/Ordnance Disposal Area	48	33	32	7	1
Waste Line	41	24	25	5	2
Waste Treatment Plant	25	15	15	8	2
Sewage Treatment Plant	0	0	0	0	0
Petroleum, Oil, Lubricant Distribution Line	36	29	21	2	0
Underground Storage Tank Farm	38	33	19	2	0
Other	8	7	8	0	0
Firing Range	2	2	1	1	0
Soil Contaminated After Tank Removal	10	6	7	1	0
Storm Drain	3	3	1	0	0
Oil/Water Separator	10	5	8	1	1
Maintenance Yard	0	0	0	0	0
Low-level Radioactive Waste Area	12	3	10	0	0
Washrack	9	1	8	0	0
Drainage Ditch	6	5	6	4	0
Small Arms Range	2	0	2	0	0
Incinerator	1	0	1	0	0
Contaminated Soil Piles	5	4	4	0	0

Exhibit C-4: Frequency of Matrices by DOD Site Type (continued)

Site Type	No. of Sites with Data	Ground-water	Soil	Surface water	Sediment
Mixed Waste Area	7	3	6	0	0
Pistol Range	4	2	4	0	0
Chemical Disposal	0	0	0	0	0
Pesticide Shop	3	1	3	0	0
Industrial Discharge	4	2	3	0	0
Surface Runoff	2	0	2	0	0
Leach Field	1	1	0	1	0
Plating Shop	1	0	1	0	0
Sewage Effluent Settling Pond	0	0	0	0	0
Dip Tank	1	0	1	0	0
Optical Shop	0	0	0	0	0
Other	8	7	8	0	0
Total	3,212	2,290	2,163	613	189
<p>Note: The total count for a site type may exceed the number of sites with data for the site type, because a site may have more than one contaminated matrix.</p> <p>Source: DOD, Office of the Deputy Under Secretary of Defense (Environmental Security), Restoration Management Information System, November 1995. Data as of September 1994.</p>					

Exhibit C-5: Frequency of Major Contaminant Groups by Matrix and DOD Component

DOD Component Contaminant Group	Ground- water	Soil	Surface water	Sediment	Total (All Media)
Army					
VOCs	289	59	24	5	326 (41%)
SVOCs	90	97	23	24	193 (24%)
Metals	231	343	103	69	527 (66%)
Other	209	177	42	25	341 (43%)
Fuels	25	23	0	0	40 (5%)
Explosives	114	125	49	2	185 (23%)
VOCs & SVOCs	11	8	7	2	13 (2%)
VOCs & Metals	18	12	6	2	24 (3%)
SVOCs & Metals	8	6	5	4	10 (1%)
VOCs, SVOCs, & Metals	6	5	4	2	7 (1%)
No. of Sites with Data	534	485	137	87	794
Navy					
VOCs	515	310	75	4	637 (70%)
SVOCs	317	428	61	14	573 (63%)
Metals	470	492	149	23	692 (76%)
Other	188	359	67	15	452 (49%)
Fuels	220	113	10	1	288 (31%)
Explosives	41	38	6	0	56 (6%)
VOCs & SVOCs	91	107	16	6	122 (13%)
VOCs & Metals	110	107	18	6	131 (14%)
SVOCs & Metals	97	126	21	8	144 (16%)
VOCs, SVOCs, & Metals	85	83	16	8	97 (11%)
No. of Sites with Data	648	659	166	24	916
Air Force					
VOCs	815	512	125	11	1,012 (76%)
SVOCs	288	369	111	30	575 (43%)
Metals	597	593	198	48	909 (68%)
Other	211	346	69	18	482 (36%)
Fuels	184	245	21	1	362 (27%)
Explosives	6	6	0	0	12 (1%)
VOCs & SVOCs	70	82	22	9	93 (7%)
VOCs & Metals	87	96	27	8	107 (8%)
SVOCs & Metals	55	74	22	9	77 (6%)
VOCs, SVOCs, & Metals	53	67	21	8	69 (5%)
No. of Sites with Data	1,003	901	292	63	1,331

Exhibit C-5: Frequency of Major Contaminant Groups by Matrix and DOD Component (continued)

DOD Component Contaminant Group	Ground- water	Soil	Surface water	Sediment	Total (All Media)
FUDS					
VOCs	47	40	6	2	70 (74%)
SVOCs	12	25	1	3	34 (36%)
Metals	31	45	14	12	59 (63%)
Other	13	21	4	6	28 (30%)
Fuel	9	8	0	1	14 (15%)
Explosives	7	5	0	1	11 (12%)
VOCs & SVOCs	2	1	2	1	3 (3%)
VOCs & Metals	1	1	1	0	2 (2%)
SVOCs & Metals	1	1	1	0	2 (2%)
VOCs, SVOCs, & Metals	1	1	1	0	2 (2%)
No. of Sites with Data	61	73	18	14	94
DLA					
VOCs	35	16	0	1	48 (62%)
SVOCs	2	15	0	0	17 (22%)
Metals	21	19	0	0	37 (48%)
Other	10	9	0	0	19 (25%)
Fuels	4	4	0	0	8 (10%)
Explosives	0	0	0	0	0 (0%)
VOCs & SVOCs	NA	NA	NA	NA	NA NA
VOCs & Metals	NA	NA	NA	NA	NA NA
SVOCs & Metals	NA	NA	NA	NA	NA NA
VOCs, SVOCs, & Metals	NA	NA	NA	NA	NA NA
No. of Sites with Data	44	45	0	1	77
Total DOD					
VOCs	1,701	937	230	23	2,093 (65%)
SVOCs	709	934	196	71	1,392 (43%)
Metals	1,350	1,492	464	152	2,224 (69%)
Other	631	912	182	64	1,322 (41%)
Fuels	442	393	31	3	712 (22%)
Explosives	168	174	55	3	264 (8%)
VOCs & SVOCs	174	198	47	18	231 (7%)
VOCs & Metals	216	216	52	16	264 (8%)
SVOCs & Metals	161	207	49	21	233 (7%)
VOCs, SVOCs, & Metals	145	156	42	18	175 (5%)
No. of Sites with Data	2,290	2,163	613	189	3,212
Notes: • FUDS = Formerly used defense sites; DLA = Defense Logistics Agency; NA = Not available; VOC = Volatile organic compound; SVOC = Semivolatile organic compound. • The total count for a matrix or contaminant group may exceed the number of sites with data, because a site may have more than one contaminant group or contaminated matrix.					
Source: DOD, Office of the Deputy Under Secretary (Environmental Security), Restoration Management Information System, November, 1995. Data as of September 1994.					

Exhibit C-6: Frequency of Major Contaminant Groups by DOD Site Type

Site Type	Total No. of Sites ^a	No. of Sites with Data	VOCs	Metals	SVOCs	Other	Fuels	Explosives
Underground Storage Tanks	1361	444	355	222	139	93	201	0
Spill Area	1234	539	376	318	255	177	142	26
Landfill	914	491	313	412	240	264	63	23
Unexploded Munitions/ Ordnance Area	784	14	4	12	5	9	0	5
Surface Disposal Area	748	347	221	260	182	171	45	24
Disposal Pit/Dry Well	612	334	194	273	119	143	56	86
Storage Area	608	181	94	131	112	96	28	4
Contaminated Groundwater	357	86	73	39	28	43	10	4
Fire/Crash Training Area	271	157	125	125	89	70	59	3
Building Demolition/Debris Removal	225	6	1	4	5	2	0	0
Surface Impoundment/ Lagoon	211	93	47	70	37	52	6	22
Aboveground Storage Tanks	202	40	30	24	20	12	13	0
Contaminated Fill	199	37	27	26	9	15	5	6
Contaminated Building	174	37	9	27	14	15	1	1
Burn Area	160	78	31	64	16	36	5	20
Contaminated Sediments	136	49	25	37	22	20	6	5
Explosive/Ordnance Disposal Area	130	48	15	38	17	26	1	18
Waste Line	92	41	27	29	15	22	10	3
Waste Treatment Plant	91	25	12	18	10	11	5	4
Sewage Treatment Plant	83	0	0	0	0	0	0	0
POL Distribution Line	82	36	32	17	12	5	22	0
Underground Storage Tank Farm	79	38	36	17	18	4	23	0
Firing Range	69	2	0	1	0	1	0	1
Soil Contaminated After Tank Removal	60	10	8	3	2	2	3	0

Exhibit C-6: Frequency of Major Contaminant Groups by DOD Site Type (continued)

Site Type	Total No. of Sites ^a	No. of Sites with Data	VOCs	Metals	SVOCs	Other	Fuels	Explosives
Storm Drain	57	3	3	1	2	1	0	0
Oil/Water Separator	52	10	7	7	5	5	5	1
Maintenance Yard	49	0	0	0	0	0	0	0
Low-level Radioactive Waste Area	33	12	8	11	0	5	1	0
Washrack	25	9	1	7	2	4	1	0
Drainage Ditch	22	6	5	5	2	4	0	3
Small Arms Range	22	2	0	2	0	0	0	0
Incinerator	19	1	0	0	0	0	0	1
Contaminated Soil Piles	17	5	3	3	2	2	1	0
Mixed Waste Area	16	7	4	4	5	3	0	0
Pistol Range	14	4	0	4	0	0	0	0
Chemical Disposal	11	0	0	0	0	0	0	0
Pesticide Shop	10	3	1	2	1	2	0	0
Industrial Discharge	8	4	3	4	1	2	0	0
Surface Runoff	5	2	0	1	1	1	0	0
Leach Field	4	1	0	1	1	0	0	0
Plating Shop	4	1	1	1	1	1	0	0
Sewage Effluent Settling Pond	3	0	0	0	0	0	0	0
Dip Tank	2	1	0	0	1	0	0	0
Optical Shop	1	0	0	0	0	0	0	0
Other	78	8	2	4	2	3	0	4
Total	9,331	3,212	2,093	2,224	1,392	1,322	712	264

Notes:

- ^a Number of sites needing remediation; data were available for 3,212 of the sites needing remediation.
- POL = Petroleum, oil, lubricant
- The total count for a site type may exceed the number of sites with data for the site type, because a site may have more than one contaminant group.

Source: DOD, Office of the Deputy Under Secretary of Defense (Environmental Security), Restoration Management Information System, November 1995. Data as of September 1994.

**Exhibit C-7: Frequency of Contaminant Subgroup by Matrix
Percent of Sites with Data**

Contaminant	Groundwater	Soil	Surface Water	Sediment
Metals	58.86	60.77	75.69	80.42
Halogenated VOCs	56.55	22.80	8.87	5.29
Nonhalogenated VOCs	44.06	28.22	20.39	8.99
Toxic Elements	19.39	34.54	23.82	30.16
Nonhalogenated SVOCs	24.67	26.47	25.77	22.22
BTEX	19.30	16.03	5.06	2.65
PAHs	5.98	15.99	3.92	15.34
Pesticides/Herbicides	5.41	15.42	7.34	16.93
Explosives/Propellants	7.34	7.10	8.97	1.59
Halogenated SVOCs	6.68	4.65	1.96	2.65
Other	7.42	2.65	5.71	3.70
PCBs	1.48	7.10	1.47	6.88
Inorganic Cyanides	3.19	3.10	2.94	1.06
Solvents	1.05	0.12	0.00	0.00
Radioactive Metals	0.13	0.57	0.00	0.00
Dioxins/Furans	0.09	0.08	0.16	0.00
Organic Corrosives	0.09	0.20	0.00	0.00
Inorganic Corrosives	0.04	0.00	0.00	0.00
Organic Cyanides	0.00	0.04	0.00	0.00
Notes: <ul style="list-style-type: none"> • VOC = Volatile organic compound; SVOC = Semivolatile organic compound; BTEX = Benzene, toluene, ethylbenzene, xylene; PAH = Polynuclear Aromatic Hydrocarbons; PCB = Polychlorinated biphenyls. • Data were available for 3,212 sites. 				
Source: DOD, Office of the Deputy Under Secretary of Defense (Environmental Security) Restoration Management Information System (RMIS), November 1995. Data as of September 1994.				

APPENDIX D

ADDITIONAL DATA ON

DEPARTMENT OF ENERGY SITES

Exhibit D-1: DOE Installations and Other Locations Where Remedial Action is Ongoing or Completed¹

State	Installation/Site	Program ²	Status ³	No. of Operable Units ^{3,4}	Estimated Budget FY 1997 (millions) ³	Estimated Life-Cycle Cost (millions) ³
AK	Project Chariot	ER	RA complete			
AZ	Monument Valley Site	ER/UMTRA	RA complete (surface)			
	Tuba City Site	ER/UMTRA	RA complete (surface)			
CA	Energy Technology Engineering Center	ER (including D&D)	RA, D&D ongoing	16 ⁵	\$4.2 ⁵	\$131.0 ⁵
	Lawrence Livermore Laboratory	ER (including D&D)	RA ongoing	11	\$22.5	\$639.0
	Rockwell International	ER (including D&D)	RA, D&D ongoing	⁶		
	Sandia National Laboratory - Livermore	ER	RA ongoing	4	\$1.9	\$13.5
	University of California	ER/FUSRAP	RA complete			
CO	Durango Site	ER/UMTRA	RA complete (surface)			
	Grand Junction Mill Tailing Site	ER/UMTRA	RA ongoing (surface)	1	\$12.8	\$73.3
	Grand Junction Projects Office Site	ER (including D&D)	RA ongoing	1	\$10.3	\$466.9
	Gunnison	ER/UMTRA	RA ongoing (surface)	1	\$0.9	\$12.3
	Maybell	ER/UMTRA	RA ongoing (surface)	1	\$4.3	\$22.3
	Naturita	ER/UMTRA	RA ongoing	1	\$13.4	\$43.0
	Old North Continent (Slick Rock)	ER/UMTRA	RA ongoing (surface)	1	\$9.1 ⁷	\$32.9 ⁷
	Rifle Mill (Old and New)	ER/UMTRA	RA ongoing (surface)	2	\$1.4	\$20.3
	Union Carbide (Slick Rock)	ER/UMTRA	RA ongoing (surface)	2	⁸	⁸

Exhibit D-1: DOE Installations and Other Locations Where Remedial Action is Ongoing or Completed (continued)¹

State	Installation/Site	Program ²	Status ³	No. of Operable Units ^{3,4}	Estimated Budget FY 1997 (millions) ³	Estimated Life-Cycle Cost (millions) ³
CT	Combustion Engineering	ER/FUSRAP	RA ongoing	1	\$43.7	\$233.9
	Seymour Specialty Wire	ER/FUSRAP	RA complete			
ID	Idaho National Engineering Laboratory	ER (including D&D) on NPL	D&D, RA ongoing	106	\$112.8	\$3,049.1
	Lowman Site	ER/UMTRA	RA complete			
IL	Fermi National Accelerator Laboratory	No Environmental Restoration activities planned				
	Granite City Steel	ER/FUSRAP	RA complete			
	National Guard Armory	ER/FUSRAP	RA complete			
	University of Chicago	ER/FUSRAP	RA complete			
KY	Maxey Flats	ER on NPL	DOE is funding a portion of this cleanup as a Potentially Responsible Party; cleanup is being carried out by the State of Kentucky under a ROD issued by EPA in 1991.			
MA	Ventron Corporation	ER/FUSRAP	RA ongoing	1	NA	NA
MI	General Motors	ER/FUSRAP	RA completed			
MO	Kansas City Plant	ER (including D&D)	RA ongoing	13	\$3.5	\$28.1
	Latty Avenue Properties (includes Hazelwood Interim Storage Site and Futura Coatings)	ER/FUSRAP on NPL	RA ongoing	2	9	10
	St. Louis Airport Site Vicinity Properties	ER/FUSRAP on NPL	RA ongoing	1	9	10
	St. Louis Downtown Site	ER/FUSRAP	RA ongoing	1	9	10
	Weldon Spring Site	ER (including D&D) on NPL	RA ongoing	8	\$66.0	\$447.9
MS	Salmon Test Site	ER	RA ongoing	2	\$2.9 ¹¹	\$7.7 ¹¹
NE	Hallam Nuclear Power Facility	ER (D&D only)	D&D complete; S&M ongoing			

Exhibit D-1: DOE Installations and Other Locations Where Remedial Action is Ongoing or Completed (continued)¹

State	Installation/Site	Program ²	Status ³	No. of Operable Units ^{3,4}	Estimated Budget FY 1997 (millions) ³	Estimated Life-Cycle Cost (millions) ³
NJ	Kellex/Pierpont	ER/FUSRAP	RA complete			
	Middlesex Municipal Landfill	ER/FUSRAP	RA complete			
	Middlesex Sampling Plant	ER/FUSRAP	RA ongoing	1	\$2.8	\$24.8
NM	Acid/Pueblo Canyon	ER/FUSRAP	RA complete			
	Ambrosia Lake	ER/UMTRA	RA ongoing (surface)	1	\$0.2	\$1.2
	Bayo Canyon	ER/FUSRAP	RA complete			
	Chupadera Mesa	ER/FUSRAP	RA complete			
	Inhalation Toxicology Research Institute	ER	RA ongoing	4	\$0.395	\$2.2
	Los Alamos National Laboratory	ER (including D&D)	D&D, RA ongoing	6	\$53.2	\$623.7
	Pagano Salvage	ER	RA complete			
	Shiprock Site	ER/UMTRA	RA complete (surface)			
	South Valley Superfund Site	ER on NPL	DOE does not manage the cleanup project at this site; it is responsible for reimbursing General Electric, which currently owns the site, for cleanup costs. Soil and groundwater remedies already have been chosen.			
	Waste Isolation Pilot Plant	No environmental restoration, waste management only				
NY	Baker-Williams Warehouse	ER/FUSRAP	RA complete			
	Colonie Interim Storage	ER/FUSRAP	RA ongoing	1	NA	NA
	Niagara Falls Storage	ER/FUSRAP	RA complete			
	Niagara Falls Vicinity Properties	ER/FUSRAP	RA complete			
	West Valley Demonstration Project	Site of DOE vitrification process demonstration to be conducted from 1996 through 1998. DOE will be responsible only for cleanup of facilities used in the demonstration; State of New York owns site.				

Exhibit D-1: DOE Installations and Other Locations Where Remedial Action is Ongoing or Completed (continued)¹

State	Installation/Site	Program ²	Status ³	No. of Operable Units ^{3,4}	Estimated Budget FY 1997 (millions) ³	Estimated Life-Cycle Cost (millions) ³
OH	Alba Craft	ER/FUSRAP	RA complete			
	Associated Aircraft and Tool	ER/FUSRAP	RA ongoing	1	NA	NA
	Baker Brothers	ER/FUSRAP	RA complete			
	Battelle Columbus Laboratories	ER (including D&D)	D&D ongoing	16	\$4.0	\$101.1
	Fernald Site	ER on NPL	RA, D&D ongoing	11	\$260.3	\$2,523.7
	HHM Safe Company	ER/FUSRAP	RA complete			
	Piqua Nuclear Power Facility	ER (D&D only)	S/M ongoing	1	0	\$0.3
	Portsmouth Gaseous Diffusion Plant	ER (including D&D)	RA, D&D ongoing	30	\$45.9	\$3,959.7
OR	Albany Metallurgical Research Center	ER/FUSRAP	RA complete			
	Lakeview Site	ER/UMTRA	RA complete (surface)			
PA	Aliquippa Forge	ER/FUSRAP	RA complete			
	Canonsburg Site	ER/UMTRA	RA complete (surface)			
	C.H. Schnoor	ER/FUSRAP	RA complete			
	Shippingport Atomic Power Station	ER	RA complete			
SC	Savannah River Site	ER (including D&D) on NPL	RA ongoing	92	\$111.7	\$12,687.0
TN	Elza Gate	ER/FUSRAP	RA complete			
	Oak Ridge Associated Universities	ER on NPL	RA ongoing	2	\$0.0	\$24.0
TX	Falls City Site	ER/UMTRA	RA complete (surface)			
UT	Green River Site	ER/UMTRA	RA complete (surface)			
	Mexican Hat Site	ER/UMTRA	RA complete (surface)			
	Monticello Remedial Action Project	ER on NPL (2 sites)	RA ongoing	3	\$21.2	\$109.9
	Salt Lake City Site	ER/UMTRA	RA complete (surface)			

Exhibit D-1: DOE Installations and Other Locations Where Remedial Action is Ongoing or Completed (continued)¹

State	Installation/Site	Program ²	Status ³	No. of Operable Units ^{3,4}	Estimated Budget FY 1997 (millions) ³	Estimated Life-Cycle Cost (millions) ³
WA	Hanford Site	ER (including D&D) on NPL (4 sites)	RA ongoing	78	\$138.8	\$8,349.2
WY	Riverton Site	ER/UMTRA	RA complete (surface)			
	Spook Site	ER/UMTRA	RA complete (surface)			
ER = Environmental Restoration UMTRA = Uranium Mill Tailing Remedial Action C/A = Characterization and assessment D&D = Decontamination and Decommissioning RA = Remedial Action NPL = National Priorities List IA = Interim Action S/M = Surveillance and monitoring FUSRAP = Formerly Utilized Sites Remedial Action Program						
Notes: ¹ This table includes installations and other locations where remedial action is in progress or has been completed for some or all operable units. Some installations and other locations included here also may appear in Exhibit A-1, because characterization and assessment still may be in progress at some operable units. These installations are included on both tables, because they continue to represent opportunities for vendors of remedial technologies. ² U.S. Department of Energy, "The 1996 Baseline Environmental Report," DOE/EM-0290, June 1996. ³ U.S. Department of Energy, "The 1996 Baseline Environmental Report," DOE/EM-0290, June 1996, and data as of June 1996 from DOE's "1996 Baseline Environmental Report" Database and other internal DOE databases provided by the Systems Management Division, Office of Program Integration, Office of Environmental Restoration, and interviews with selected site operations staff at DOE Headquarters. Actual Congressional appropriations for FY 1997 may differ from the amounts printed here. Data on operable units and life-cycle costs come from several different sources, which are continuously being revised by DOE staff as conditions at specific installations and other locations change and as new sites are identified. In addition, these data were extracted from these sources at different times. Therefore, although these data provide an indication of the approximate level of effort needed at a given location, their sum may not accurately reflect the program total. ⁴ An "operable unit" consists of one or more "sites" (individual areas of contamination). DOE aggregates sites with similar characteristics or sources into operable units to facilitate remedy selection and operations for all its remediation projects, whether they are conducted under CERCLA, RCRA, or other authorities. ⁵ Includes both Energy Technology Engineering Center and Rockwell International site. ⁶ See Energy Technology Engineering Center entry. ⁷ Includes Old North Continent (Slick Rock) and Union Carbide (Slick Rock) sites. ⁸ See Old North Continent (Slick Rock). ⁹ Total estimated FY97 budget for all Missouri FUSRAP sites is \$10.4 million. Site-by-site estimates are not available. ¹⁰ Total estimated life-cycle cost for all Missouri FUSRAP sites is \$243.8 million. Site-by-site estimates are not available. ¹¹ Work at Amchitka Island (AK), Project Rio Blanco and Project Rulison (CO), Salmon Test Site (MS), Project Gassbuggy and Gnome-Coach Site (NM), and the Central Nevada, Shoal, and Tonopah Test Sites (NV) is managed by and funded through DOE's Nevada Operations Office.						

**Exhibit D-2: Contaminants and Contaminated Media Volumes To Be Remediated
at DOE Installations Where Characterization and Assessment Are Ongoing¹**

State	Installation/Site	Examples of Contaminants of Concern ^{2,3}	Estimated Soil/Sediment Volume To Be Addressed (Cu. Yds.) ⁴	Estimated Ground-water Volume To Be Remediated (Cu. Yds.) ⁴	Estimated Rubble/Debris Volume To Be Remediated (Cu. Yds.) ⁴
AK	Amchitka Island	Organic compounds, hydrocarbons, radionuclides, beryllium, lead	9,000	104,900	5,320
AZ	Monument Valley	Cadmium, chromium, molybdenum, net gross alpha, nitrate, radium-226/228, selenium, uranium (ground water)	Complete	Undetermined	NA
	Tuba City	Net gross alpha, nitrate, selenium, uranium (ground water)	Complete	Undetermined	NA
CA	Energy Technology Engineering Center	Radioactive and chemical waste (soil and buildings); solvents, tritium, alpha and beta radioactivity, radium (ground water)	Not reported	Not reported	Not reported
	General Atomics	Low-level radioactive waste, low-level mixed waste, asbestos, lead	Undetermined	Undetermined	Undetermined
	General Electric/Vallecitos Nuclear Center	Low-level radioactive waste and transuranic waste	NA	NA	20
	Geothermal Test Facility	Salts and minerals (sediments and debris); arsenic (soil and debris); asbestos (building materials)	11,960	NA	Not reported
	Laboratory for Energy-Related Health Research	Nitrates, chromium, chloroform, tritium, carbon (ground water); low-level radioactive waste (soil); low-level radioactive waste, asbestos, chemical and biological waste (buildings and facilities)	810	Undetermined	520

**Exhibit D-2: Contaminants and Contaminated Media Volumes To Be Remediated
at DOE Installations Where Characterization and Assessment Are Ongoing (continued)¹**

State	Installation/Site	Examples of Contaminants of Concern ^{2,3}	Estimated Soil/Sediment Volume To Be Addressed (Cu. Yds.) ⁴	Estimated Ground-water Volume To Be Remediated (Cu. Yds.) ⁴	Estimated Rubble/Debris Volume To Be Remediated (Cu. Yds.) ⁴
CA (con- tinued)	Lawrence Berkeley Laboratory	Chlorinated hydrocarbons, solvents, tritium, motor fuels (ground water); radioactive and mixed waste (soil and buildings)	50	181,700	12,200
	Lawrence Livermore Laboratory	VOCs, fuel hydrocarbons, depleted uranium, PCBs, high explosives (soil); tritium, chlorinated hydrocarbons, TCE (ground water); radioactive and hazardous waste, asbestos (buildings)	2,307,000	1,753,000	Not reported
	Oxnard	PCBs, tetrachloroethane, fuel products (soil)	Undetermined	Undetermined	Undetermined
	Salton Sea Test Base	Radioactive and chemical waste	Undetermined	Undetermined	Undetermined
	Stanford Linear Accelerator Center	PCBs, petroleum hydrocarbon, lead (soil); VOCs, TCE (ground water)	111,100	2,614,380	980
CO	Durango	Arsenic, cadmium, lead, molybdenum, net gross alpha, selenium, uranium (ground water)	Complete	Undetermined	NA
	Grand Junction Mill Tailing Site	Radon, heavy metals, radium, thorium (soil); molybdenum, net gross alpha, selenium, uranium (ground water)	45,440 (RA ongoing)	117,380	3,550
	Gunnison	Cadmium, uranium (ground water)	345,485 (RA ongoing)	Undetermined	NA
	Maybell	Arsenic, cadmium, molybdenum, nitrate, radium-226/228, selenium, uranium (ground water)	2,800,000 (RA ongoing)	Undetermined	NA

**Exhibit D-2: Contaminants and Contaminated Media Volumes To Be Remediated
at DOE Installations Where Characterization and Assessment Are Ongoing (continued)¹**

State	Installation/Site	Examples of Contaminants of Concern ^{2,3}	Estimated Soil/Sediment Volume To Be Addressed (Cu. Yds.) ⁴	Estimated Ground-water Volume To Be Remediated (Cu. Yds.) ⁴	Estimated Rubble/Debris Volume To Be Remediated (Cu. Yds.) ⁴
CO (con- tinued)	Naturita	Arsenic, molybdenum, net gross alpha, radium-226/228, selenium, uranium (ground water)	704,000 (RA ongoing)	Undetermined	NA
	Old North Continent (Slick Rock)	Radon, heavy metals, radium, thorium (soil); selenium, uranium (ground water)	Not reported	Undetermined	NA
	Project Rio Blanco	Organic compounds, hydrocarbons, radionuclides, beryllium, lead	6,000 ⁵	Undetermined	Undetermined
	Project Rulison	Organic compounds, hydrocarbons, radionuclides, beryllium, lead	⁶	Undetermined	Undetermined
	Rifle Mill (New)	Radon, heavy metals, radium, thorium (soil); arsenic, barium, cadmium, chromium, lead, molybdenum, net gross alpha, nitrate, radium-226/228, selenium, uranium (ground water)	2,000,000	Undetermined	NA
	Rifle Mill (Old)	Radon, heavy metals, radium, thorium (soil); arsenic, barium, cadmium, chromium, lead, molybdenum, net gross alpha, radium 226/228, selenium, uranium (ground water)	259,000	Undetermined	NA
	Rocky Flats	Plutonium, americium, uranium, VOCs, PAHs, beryllium (soils); nitrates, metals, solvents (ground water); radionuclides, metals, VOCs, PCBs (surface water)	414,900	1,550,000	Undetermined
	Union Carbide (Slick Rock)	Radon, heavy metals, radium, thorium (soil); cadmium, molybdenum, net gross alpha, nitrate, radium226/228, selenium, uranium (ground water)	Not reported	Undetermined	NA
FL	Pinellas Plant	VOCs	10	91,500	30

**Exhibit D-2: Contaminants and Contaminated Media Volumes To Be Remediated
at DOE Installations Where Characterization and Assessment Are Ongoing (continued)¹**

State	Installation/Site	Examples of Contaminants of Concern ^{2,3}	Estimated Soil/Sediment Volume To Be Addressed (Cu. Yds.) ⁴	Estimated Ground-water Volume To Be Remediated (Cu. Yds.) ⁴	Estimated Rubble/Debris Volume To Be Remediated (Cu. Yds.) ⁴
FL	Pinellas Plant	VOCs	10	91,500	30
HI	Kauai Test Facility	Chemical waste	930	7,400	Undetermined
IA	Ames Laboratory	Uranium, thorium, tritium, mercury, thallium, potassium, lithium, diesel fuels, kerosene	1,270	30	150
ID	Argonne National Laboratory-West	Uranium, thorium, tritium, heavy metals, PCBs, organic corrosives, dioxins/furans, sodium	750	Not reported	200
	Idaho National Engineering Laboratory	Heavy metals, PCBs, acids, asbestos, solvents, low-level radioactive waste, trans-uranic waste	851,720	989,540	33,380
IL	Argonne National Laboratory-East	Radionuclides, VOCs, SVOCs, PAHs, PCBs, arsenic, chromium, pesticides, aromatic hydrocarbons, chlorinated benzenes, heavy metals, lead (soil, ground water, and sediments); cobalt ⁶⁰ , iron, nickel, lead, tritium, uranium ^{235/238} , beryllium, cadmium, plutonium ²³⁹ , americium ²⁴¹ , mixed fission products (reactors and reactor facilities)	125,630	434,750	685,420
	Madison	Uranium	10	NA	NA
	Site A/Plot M, Palos Forest Preserve	VOCs, SVOCs, heavy metals, radioactive waste	6,540	Undetermined	Undetermined
KY	Paducah Gaseous Diffusion Plant	Petroleum hydrocarbons, PCBs, uranium, technetium ⁹⁹ , mercury (soil and sediments); TCE, technetium ⁹⁹ (ground water)	756,850	89,781,060	37,650

**Exhibit D-2: Contaminants and Contaminated Media Volumes To Be Remediated
at DOE Installations Where Characterization and Assessment Are Ongoing (continued)¹**

State	Installation/Site	Examples of Contaminants of Concern ^{2,3}	Estimated Soil/Sediment Volume To Be Addressed (Cu. Yds.) ⁴	Estimated Ground-water Volume To Be Remediated (Cu. Yds.) ⁴	Estimated Rubble/Debris Volume To Be Remediated (Cu. Yds.) ⁴
MA	Chapman Valve	Uranium	Not reported	NA	Not reported
	Shpack Landfill	Uranium residues, radium	9,370	NA	NA
MD	W.R. Grace & Company	Thorium	Not reported	NA	Not reported
MO	Kansas City Plant	PCBs, VOCs, metals, solvents, petroleum hydrocarbons	32,230	110,290	3,110
	St. Louis Airport Site	Uranium processing residues	250,000	NA	NA
	Weldon Spring Site	Low-level radioactive, chemical, and mixed wastes	321,940	650,200	163,090
NJ	DuPont & Company	Uranium	8,270	NA	⁷
	Maywood Chemical Works	Thorium tailings	395,000	NA	NA
	New Brunswick Site	Radium, uranium	4,500	NA	NA
	Princeton Plasma Physics Laboratory	Petroleum hydrocarbons, solvents	Not reported	Not reported	Not reported
	Wayne	Thorium, thorium tailings	109,000	NA	⁷

**Exhibit D-2: Contaminants and Contaminated Media Volumes To Be Remediated
at DOE Installations Where Characterization and Assessment Are Ongoing (continued)¹**

State	Installation/Site	Examples of Contaminants of Concern ^{2,3}	Estimated Soil/Sediment Volume To Be Addressed (Cu. Yds.) ⁴	Estimated Ground-water Volume To Be Remediated (Cu. Yds.) ⁴	Estimated Rubble/Debris Volume To Be Remediated (Cu. Yds.) ⁴
NM	Ambrosia Lake	Radon, heavy metals, radium, thorium (soil); chromium, molybdenum, net gross alpha, nitrate, radium ^{226/228} , selenium, uranium (ground water)	2,000,000 (RA ongoing)	Undetermined	NA
	Gassbuggy Site	Organic compounds, hydrocarbons, radionuclides, beryllium, lead	6,000 ⁸	Undetermined	Undetermined
	Gnome Coach Site	Organic compounds, hydrocarbons, radionuclides, beryllium, lead	⁹	Undetermined	Undetermined
	Los Alamos National Laboratory	Radionuclides, VOCs, SVOCs, heavy metals, high explosives, PCBs, asbestos, pesticides, herbicides (soil); tritium, cesium, strontium (ground water)	12,694,000	13,770	Not Reported
	Sandia National Laboratory-Albuquerque	PCBs, radionuclides, metals, petroleum hydrocarbons, high explosives, VOCs, SVOCs	772,500	40	24,800
	Shiprock	Net gross alpha, nitrate, radium ^{226/228} , selenium, uranium (ground water)	Complete	Undetermined	NA
NV	Central Nevada Test Site	Organic compounds, hydrocarbons, beryllium, lead, plutonium, tritium	6,000 ¹⁰	Undetermined	Undetermined
	Nevada Test Site	Organic compounds, hydrocarbons, beryllium, lead, plutonium, tritium	18,931,550	104,900	5,320
	Shoal Test Site	Organic compounds, hydrocarbons, beryllium, lead, plutonium, tritium	¹¹	Undetermined	Undetermined
	Tonopah Test Range	Organic compounds, hydrocarbons, beryllium, lead, plutonium, tritium	¹¹	Undetermined	Undetermined

**Exhibit D-2: Contaminants and Contaminated Media Volumes To Be Remediated
at DOE Installations Where Characterization and Assessment Are Ongoing (continued)¹**

State	Installation/Site	Examples of Contaminants of Concern ^{2,3}	Estimated Soil/Sediment Volume To Be Addressed (Cu. Yds.) ⁴	Estimated Ground-water Volume To Be Remediated (Cu. Yds.) ⁴	Estimated Rubble/Debris Volume To Be Remediated (Cu. Yds.) ⁴
NY	Ashland Oil CO.#1	Uranium ore tailings	Not reported	NA	NA
	Ashland Oil Co.#2	Uranium ore tailings	52,100	NA	NA
	Bliss & Laughlin	Low-level radioactive waste, uranium (trace)	Not reported	NA	NA
	Brookhaven National Laboratory	Uranium, plutonium, cesium ^{134/137} , tritium, strontium ⁹⁰ , cobalt ⁶⁰ , sodium ²² , radium ²²⁶ , metals, organics	38,930	56,993,590	520
	Linde Air Products	Uranium ore tailings	70,000	NA	NA
	Seaway Industrial Park	Uranium ore tailings	Not reported	NA	NA
	Separation Process Research Unit	Plutonium, stontium ⁹⁰ , cesium ¹³⁷	Undetermined	NA	Undetermined
OH	B and T Metals	Uranium	NA	NA	1,000
	Fernald Site	Uranium, thorium, oils, reactive chemicals, organic compounds	1,236,650	512,500,000	302,250
	Luckey	Beryllium, uranium (traces)	64,000	NA	NA
	Mound Plant	VOCs, petroleum hydrocarbons, tritium, plutonium, thorium (soil); tritium (ground water)	200,990	890,690	36,100
	Portsmouth Gaseous Diffusion Plant	Low-concentration radionuclides, chlorinated solvents, PCBs, heavy metals	32,280	741,230	71,160
	RMI Site	Uranium, TCE, technitium	35,520	620	5,830
OR	Lakeview Site	Arsenic, cadmium (ground water)	Complete	Undetermined	NA
PA	Canonsburg Site	Uranium	Complete	Undetermined	NA

**Exhibit D-2: Contaminants and Contaminated Media Volumes To Be Remediated
at DOE Installations Where Characterization and Assessment Are Ongoing (continued)¹**

State	Installation/Site	Examples of Contaminants of Concern ^{2,3}	Estimated Soil/Sediment Volume To Be Addresseda (Cu. Yds.) ⁴	Estimated Ground-water Volume To Be Remediated (Cu. Yds.) ⁴	Estimated Rubble/Debris Volume To Be Remediated (Cu. Yds.) ⁴
PR	Center for Environmental Research	Asbestos, PCBs	Not reported	Not reported	Not reported
SC	Savannah River Site	TCE, PCE, aluminum, zinc, arsenic, cadmium, chromium, lithium, mercury, lead, strontium ⁹⁰ , cesium ^{137/139} , cobalt ⁶⁰ , tritium, thorium	11,276,500	406,809,230	714,000
TN	Oak Ridge K-25 Site	Asbestos, petroleum hydrocarbons, PCBs, radionuclides (principally uranium), mixed waste	4,900	1,249,440	109,560
	Oak Ridge National Laboratory	Strontium ⁹⁰ , cesium ¹³⁷ , cobalt ⁶⁰ , tritium, PCBs, heavy metals, mixed waste	92,870	90,330	60,920
	Oak Ridge Reservation Offsite	Radionuclides (cesium ¹³⁷ , cobalt ⁶⁰ , tritium, strontium ⁹⁰), mercury, lead, arsenic, selenium, chromium, PCBs, dioxin, chlordane, polychlorinated hydrocarbons	136,960	10	Not reported
	Oak Ridge Y-12 Plant	Radionuclides (depleted uranium and uranium ²³⁵), nitrates, organic solvents, PCBs, beryllium compounds, asbestos, mercury, cadmium	464,910	4,689,070	119,750
TX	Falls City Site	Molybdenum, uranium (ground water)	Complete	Undetermined	NA
	Pantex Plant	Organic solvents, high explosives, heavy metals	5,080	30	Not reported
UT	Green River Site	Arsenic, cadmium, chromium, lead, molybdenum, net gross alpha, nitrate, radium ^{226/228} , selenium, uranium (ground water)	Complete	Undetermined	NA
	Mexican Hat Site	Chromium, molybdenum, net gross alpha, nitrate, radium ^{226/228} , selenium, uranium (ground water)	Complete	Undetermined	NA

**Exhibit D-2: Contaminants and Contaminated Media Volumes To Be Remediated
at DOE Installations Where Characterization and Assessment Are Ongoing (continued)¹**

State	Installation/Site	Examples of Contaminants of Concern ^{2,3}	Estimated Soil/Sediment Volume To Be Addressed (Cu. Yds.) ⁴	Estimated Ground-water Volume To Be Remediated (Cu. Yds.) ⁴	Estimated Rubble/Debris Volume To Be Remediated (Cu. Yds.) ⁴
UT (continued)	Monticello Remedial Action Project	Radium, uranium, thorium, polonium, radon	2,922,460	NA	¹²
	Salt Lake City Site	Molybdenum, selenium, uranium (ground water)	Complete	Undetermined	NA
WA	Hanford Site	Tritium, cobalt, strontium, cesium, technitium, plutonium, uranium, carbon tetrachloride, nitrates, iodine, chromium, mixed waste, transuranic waste	83,840,000	26,000,000	Not reported
WY	Riverton Site	Molybdenum, net gross alpha, radium ^{226/228} , selenium, uranium (ground water)	Complete	Undetermined	NA
	Spook Site	Chromium, nitrate, radium ^{226/228} , selenium, uranium (ground water)	Complete	Undetermined	NA

Notes:

NA = Not Applicable

¹ Installations and other locations included in this table are the same as those listed in Exhibit 7-2 in the text of the Chapter.

² U.S. Department of Energy, "Estimating the Cold War Mortgage: The 1995 Baseline Environmental Report," DOE/EM-0230, March 1995; DOE/EM-40 Contaminated Media/Waste Database as of March 3, 1995; and U.S. Department of Energy, UMTRA Project Office, "Draft Program-matic Environmental Impact Statement for the Uranium Mill Tailings Remedial Action Ground Water Project," DOE/EIS-0198, April 1995.

³ When specific contaminant types were not available from the references cited in endnote 2, available waste class information has been provided to give an indication of the types of contaminants that may be present.

⁴ U.S. Department of Energy, "Estimating the Cold War Mortgage: The 1995 Baseline Environmental Report," DOE/EM-0230, March 1995, and DOE/EM-40 Contaminated Media/Waste Database as of March 3, 1995. Volume estimates have been rounded for inclusion in this table. Not all of the contaminated soil volume shown will be remediated—treated or disposed of—because a portion of the volume at some locations is below the proposed cleanup level for that location.

**Exhibit D-2: Contaminants and Contaminated Media Volumes To Be Remediated
at DOE Installations Where Characterization and Assessment Are Ongoing (continued)¹**

Notes (continued):

⁵ Includes estimated volumes for Project Rio Blanco and Project Rulison.

⁶ See Project Rio Blanco.

⁷ Included in Estimates Soil/Sediment Volume shown for this site.

⁸ Includes estimated volumes for Gassbuggy Site and Gnome-Coach Site.

⁹ See Gassbuggy Site.

¹⁰ Includes estimated volumes for Central Nevada Test Site, Shoal Test Site, and Tonopah Test Range.

¹¹ See Central Nevada Test Site.

¹² Included in Estimated Soil/Sediment Volume shown for this site.

APPENDIX E

FEDERAL AND STATE AGENCY PROGRAMS

ENVIRONMENTAL PROTECTION AGENCY

Regional Offices

U.S. EPA - Region 1
One Congress Street
Boston, Massachusetts 02203-0001
617-565-3420

U.S. EPA - Region 2
290 Broadway
New York, New York 10007-1866
212-637-3000

U.S. EPA - Region 3
841 Chestnut Street
Philadelphia, Pennsylvania 19107
215-566-5000

U.S. EPA - Region 4
100 Alabama Street, SW
Atlanta, Georgia 30303
404-562-8357

U.S. EPA - Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604-3507
312-353-2000

U.S. EPA - Region 6
1445 Ross Avenue
12th Floor, Suite 1200
Dallas, Texas 75202-2733
214-665-6444

U.S. EPA - Region 7
726 Minnesota Avenue
Kansas City, Kansas 66101
913-551-7000

U.S. EPA - Region 8
999 18th Street, Suite 500
Denver, Colorado 80202-2466
303-312-6312

U.S. EPA - Region 9
75 Hawthorne Street
San Francisco, California 94105
415-744-1305

U.S. EPA - Region 10
1200 Sixth Avenue
Seattle, Washington 98101
206-553-1200

Remedial Action Contractors (RACs)

Region 1

Brown & Root Environmental, Inc.
55 Jonspin Road
Willmington, MA 01887
Contact: George Gardner
508-658-7899

Metcalf and Eddy, Inc.
30 Harvard Mill Square
Wakefield, MA 01880
Contact: Neville Chung
617-224-6385

Region 2

The RAC Procurement for this region is on-going.

Region 3

Brown & Root Environmental, Inc.
993 Old Eagle School Road, Suite 415
Wayne PA 1987-1710
Contact: Meg Price
610-971-0900

The RAC Procurement for this region is on-going.

Region 4

The RAC Procurement for this region is in the planning process

Region 5

CH₂M Hill, Inc.
411 E. Wisconsin Ave., Suite 1600
P.O. Box 2090
Milwaukee, WI 53201

Sverdrup Environmental, Inc.
13723 Riverport Drive
Maryland Heights, MO 63043
Contact: Arl Altman
314-436-7700

Region 6

PRC/EMI Corporation
1 Dallas Center, Suite 600
350 N. Paul St.
Dallas TX 75201
Contact: Bill Miner
214-754-8765

Region 8

CDM Federal programs Corp.
1626 Cole Blvd., Suite 100
Golden, CO 80401
Contact: Michael Malloy
303-232-0131

Region 9

The RAC Procurement is in the planning process.

CH₂M Hill, Inc.
5339 Alpha Road, Suite 300
Dallas TX 75240
Contact: Kent Robibson
214-980-2188

Region 10

The RAC Procurement is in the planning process.

Region 7

Black and Veatch Waste Science Inc.
4717 Grand Avenue, Suite 500
P.O. Box 30240
Kansas City, MO 64112
Contact: Thomas Buechler
913-339-2900

ARCS Contractors**Region 1**

Arthur D. Little, Inc.
Acorn Park
Cambridge, MA 02140-2390
Contact: Ms. Renee Wong
617-864-5770

Metcalf and Eddy, Inc.
10 Harvard Mill Square
Wakefield, MA 01880
Contact: William J. Farino
617-246-5200

CDM Federal Programs Corp.
98 N. Washington St., Suite 200
Boston, MA 02114
Contact: Mr. Fred Babin
617-742-2659

Roy F. Weston, Inc.
1 Vande Graffe Dr.
Burlington, MA 01803
Contact: Rick Keller
617-229-2050

HNUS Corp.
187 Ballard Vale St.
Wilmington, MA 01887
Contact: George Gardner
508-658-7889

TRC Companies, Inc.
Boot Mills South
Foot of John Street
Lowell, MA 01852
508-970-5600

Region 2

CDM Federal Programs Corp.
40 Rector St.
New York, NY 10006
Contact: Charles W. Robinson
212-693-0370

EBASCO Services, Inc.
160 Chubb Ave.
Lyndhurst, NJ 07071
Contact: Mr. Dev. R. Sachdev
201-460-6434

ICF Kaiser Technology, Inc.
379 Thornall St., 5th floor
Edison, NJ 08837-0001
Contact: William Colvin
201-603- 3755
John Bachmann, 212-264-2702

Malcolm Pirnie, Inc.
2 Corporate Park Dr., Box 751
White Plains, NY 10602
Contact: Ralph Sarnelli
914-694-2100

Roy F. Weston, Inc.
355 Main St.
Armonk, NY 10504
Contact: Thomas Stevenson
913-273-9840

TAMS
655 Third Ave.
New York, NY 10067
Contact: Brian Styler
212-867-1777

Region 3

Black and Veatch, Inc.
Public Ledger Building, Suite 272
Independence Square
Philadelphia, PA 19106
Contact: Steve Hooper
215-627-1443

CH₂M Hill, Mid-Atlantic Office
P.O. Box 4400
Reston, VA 22090
Contact: Debbie Reif
703-471-1441

Ecology & Environment, Inc.
1528 Walnut St., Suite 1603
Philadelphia, PA 19102
Contact: Mr. Joseph Pearson
215-875-7370

NUS Corp.
One Devon Square, Suite 222
724 W. Lancaster Ave.
Wayne, PA 19087
Contact: Meg Price
215-971-0900

Tetra Tech, Inc.
10306 Eaton Plaza, Suite 340
Fairfax, VA 22030
Contact: Steve Pollak
703-385-6000

Region 4

Black & Veatch, Inc.
Perimeter Center West, Suite 212
Atlanta, GA 30338
Contact: Kendall M. Jacob
404-392-9227

CDM Federal Programs Corp.
2100 River Edge Parkway, Suite 400
Atlanta, GA 30328
Contact: Richard C. Johnson
404-952-8643
Abe Dunning, 404-952-7393

Bechtel Environmental, Inc.
P.O. Box 350
800 Oak Ridge Turnpike
Oak Ridge, TN 37830
Contact: G. Phillip Crotwell
615-482-0440

EBASCO Services, Inc.
145 Technology Park
Norcross, GA 30092-2979
Contact: David Knapp
404-662-2378

Roy F. Weston, Inc.
6021 Live Oak Parkway
Norcross, GA 30093
Contact: Michael Foulke
404-448-0644

Region 5

Black and Veatch Architects and Engineers
230 West Monroe, Suite 2250
Chicago, IL 60606
Contact: William Bruce
312-346-3775

CH₂M Hill, Inc.
310 West Wisconsin Avenue
P.O. Box 2090
Milwaukee, WI 53201
Contact: John T. Fleissner
414-272-2426

Donohue and Associates
111 North Canal St., Suite 305
Chicago, IL 60606
Contact: Roman Gau
312-902-7100

Ecology & Environment
111 West Jackson Blvd.
Chicago, IL 60604
Contact: Tom Yeates
312-663-9415

PRC Corporation
233 N. Michigan Ave., Suite 1621
Chicago, IL 60601
Contact: Majid Chaudhry
312-856-8700

Roy F. Weston, Inc.
3 Hawthorne Parkway, Suite 400
Vernon Hills, IL 60061
Contact: John W. Thorsen
708-918-4000

WW Engineering and Science
5555 Glenwood Hills Parkway, S.E.
P.O. Box 874
Grand Rapids, MI 49508-0874
Contact: Robert Phillips
616-940-4263 / 616-942-9600

Regions 6, 7, and 8

CDM Federal Programs Corp.
7 Pine Ridge Plaza
8215 Melrose Dr., Suite 100
Lenexa, KS 66214
Contact: Michael Malloy
913-492-8181

CH₂M Hill Central, Inc.
6060 South Willow Drive
Englewood, CO 80111
Contact: Don Ulrich
303-771-0900

Fluor Daniel, Inc.
12790 Merit Drive, Suite 200
Dallas, TX 75251
Contact: Mark DeLorimer
214-450-4100

Jacobs Engineering Group, Inc.
251 South Lake Ave.
Pasadena, CA 91101-3603
Contact: Steve Houser
913-492-9218

Morrison Knudsen
7100 E. Belleview Avenue, Suite 300
Englewood, CO 80111
Contact: Ed Baker
303-793-5000

Roy F. Weston, Inc.
5599 San Felipe, Suite 700
Houston, TX 77056
Contact: John DiFilippo
713-621-1620

Sverdrup Corp.
801 North Eleventh St.
St. Louis, MO 63101
Contact: Arl Altman
314-436-7600

URS Consultants, Inc.
5251 DTC Parkway, Suite 800
Englewood, CO 80111
Contact: John Coats
303-796-9700

Regions 9 and 10

Bechtel Environmental, Inc.
P.O. Box 3965
50 Beale St.
San Francisco, CA 94119
Contact: Peter R. Nunn
415-768-2797

CH₂M Hill
6425 Christie Ave., Suite 500
Emeryville, CA 94608
Contact: Stephen Hahn
415-652-2426

Ecology & Environment
101 Yesler Way, Suite 600
Seattle, WA 98104
Contact: Ronald Karpowitz
206-624-9537

ICF Technology, Inc
160 Spear St., Suite 1380
San Francisco, CA 94105-1535
Contact: Earle Krivanic
415-957-0110

Roy F. Weston, Inc.
201 Elliot Ave. West, Suite 500
Seattle, WA 98119
Contact: Frank Monahan
206-286-6000

URS Consultants, Inc.
2710 Gateway Oaks Drive, Suite 250
Sacramento, CA 95834
Contact: Gary Jandgian
916-929-2346

DEPARTMENT OF DEFENSE

U.S. Air Force

Air Combat Command
HQ ACC/CEV
Langley AFB, VA 23665-5001
Col. John Mogge
804-764-2801

Air Force Reserve
HQ AFRES/CEPV
Robins AFB, GA 31098-6001
Mr. Robert Akridge
912-327-1072

Air Training Command
HQ ATC/DEV
Randolph AFB, TX 7815-5001
Col. Richard Kochanek
512-652-2321

U.S. Air Force Academy
HQ USAFA/DEP
Colorado Springs, CO 80840-5546
Maj. Douglas Sherwood
719-472-4483

Air Force District of Washington
HQ AFDW/CEV
Bolling AFB, DC 20332
Capt. William Buckingham
202-767-1160

Air Force Space Command
HQ AFSPACECOM/CEV
Peterson AFB, CO 80914-5001
Mr. Gary Maher
719-554-5187

Air University
HQ AU/CEV
Maxwell AFB, AL 36112-5001
Mr. James Rumbley
205-293-5260

U.S. Air Forces Europe
HQ USAFE/DEP
Ramstein AB, GE
APO NY 09012-5041
Lt. Col. Jay Carson

Air Force Material Command
HQ AFMC/CEV
Wright-Patterson AFB, OH 45433-5000
Col. Tom Walker
513-257-5873

Air Mobility Command
HQ AMC/CEV
Scott AFB, IL 62225-5001
Col. Jacob Dustin
618-256-5764

Pacific Air Force
HQ PACAF/DEV
Hickam AFB HI 96853-5001
Col. Russ Marshall
808-449-5151

National Guard Bureau
HQ ANGRC/CEV
Andrews AFB, MD 20331-6008
Mr. Ron Watson
301-981-8134

Air Force Human Systems Center
HSC/EN
Tyndall AFB, FL 32403
Col. Charles Harvin
904-283-6231

HQ Naval Facilities Engineering Command
200 Stoval St.
Alexandria, VA 22332-2300
Mr. William A. Quade
703-325-0295

Air Force Base Disposal Agency
AFBDA/BD
Washington, DC 20330
Col. David Cannan
703-694-9689

Air Force Civil Engineering Support Agency
AFCES/EN
Tyndall AFB, FL 32403
Mr. Dennis Firman
904-283-6341

Air Force Center for Environmental Excellence
AFCEE/ES, Bldg. 1160
Brooks AFB, TX 78235-5000
Col. Jose Saenz
210-536-3383

U.S. Army Corps of Engineers
Missouri River Division/HTRW-MCX,
CEMRD-ED-H
12565 West Center Rd.
Omaha, NE 68144-3869
Mr. Gary Erikson
402-691-4530

U.S. Army

Huntsville Division (CEHND-PA)
P.O. Box 1600
Huntsville, AL 35807-4301
205-955-4757

Lower Mississippi Valley Division
(CELMVD-PA)
P.O. Box 80
Vicksburg, MS 39181-0080
601-634-5757

Missouri River Division (CEMRD-PA)
P.O. Box 103, Downtown Station
Omaha, NE 68101-0103
402-221-7208

New England Division (CENED-PA)
424 Trapelo Road
Waltham, MA 02254-9149
617-647-8237

North Atlantic Division (CENAD-PA)
90 Church Street
New York, NY 10007-2979
212-264-7500/7478

North Central Division (CENCD-PA)
111 North Canal Street, 12th Floor
Chicago, IL 60606-7205
312-353-6319

North Pacific Division (CENPD-PA)
P.O. Box 2870
Portland, OR 97208-2870
503-326-3768

Ohio River Division (CEORD-PA)
P.O. Box 1159
Cincinnati, OH 45201-1159
513-684-3010

Pacific Ocean Division (CEPOD-PA)
Building 230
Fort Shafter, HI 96858-5440
808-438-9862

South Atlantic Division (CESAD-PA)
Room 494, 77 Forsyth Street, S.W.
Atlanta, GA 30335-6801
404-331-6715

South Pacific Division (CESPD-PA)
630 Sansome Street, Room 1232
San Francisco, CA 94111-2206
415-705-2405

Southwestern Division (CESWD-PA)
1114 Commerce Street
Dallas, TX 75242-0216
214-767-2510

Transatlantic Division (CETAD PA)
P.O. Box 2250
Winchester, VA 22601-1450
703-665-3935

U.S. Navy

Northern Division (18)
Naval Facilities Engineering Command
10 Industrial Hwy., Mail Stop 82
Lester, PA 19113-2090
Mr. Con Mayer
215-595-0567

Chesapeake Division (18)
Naval Facilities Engineering Command
Washington Navy Yard
Washington, DC 20374-2121
Mr. Joe DeLasho
202-433-3760

Atlantic Division (18)
Naval Facilities Engineering Command
1510 Gilbert St.
Norfolk, VA 23511-6287
Mr. Bill Russel
804-445-7336

Southern Division (18)
Naval Facilities Engineering Command
1255 Eagle Dr.
P.O. Box 10068
Charleston, SC 29411
Mr. Sid Aylson
803-743-0600

Pacific Division (18)
Naval Facilities Engineering Command
Pearl Harbor, HI 96860
Mr. Mel Waki
808-471-3948

Western Division (18)
Naval Facilities Engineering Command
P.O. Box 727
San Bruno, CA 94066-0720
CDR L.A. Michlin (Lee)
415-244-2500

Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway, Bldg. 130
San Diego, CA 92132-5190
Mr. Jim Pawlisch
619-532-2591

Engineering Field Activity, Northwest (09E)
3505 NW Anderson Hill Road
Silverdale, WA 98383-9130
Mr. Leo Vaisitis
206-396-5981

Naval Energy And Environmental Support
Activity (112E)
Port Hueneme, CA 93043-5014
Mr. Stephen Eikenberry
805-982-4839

Naval Civil Engineering Laboratory (L70MP)
Port Hueneme, CA 93043
Mr. Bill Powers
805-982-1347

DEPARTMENT OF ENERGY

Operations Offices

U.S. Dept. of Energy
Chicago Operations Office
9800 South Case Avenue
Argonne, IL 60439
708-252-2428

U.S. Dept. of Energy
Oak Ridge Operations Office
200 Administrative Road
Oak Ridge, TN 37831
615-576-0715

U.S. Dept. of Energy
Fernald Operations Office
P.O. Box 398705
Cincinnati, OH 45239-8705
513-648-3101

U.S. Dept. of Energy
Savannah River Operations Office
P.O. Box A
Aiken, SC 29802
803-725-3966

U.S. Dept. of Energy
Idaho Operations Office
785 DOE Place
Idaho Falls, ID 83402
208-526-1148

U.S. Dept. of Energy
Richland Operations Office
P.O. Box 550
Richland, WA 99352
509-376-7277

U.S. Dept. of Energy
Nevada Operations Office
P.O. Box 98518
Las Vegas, NV 89193-8518
702-295-0844

U.S. Dept. of Energy
Rocky Flats Operations Office
P.O. Box 928
Golden, CO 80402
303-966-4888

U.S. Dept. of Energy
San Francisco Operations Office
1301 Play Street
Oakland, CA 94612
510-637-1809

U.S. Dept. of Energy
Albuquerque Operations Office
P.O. Box 5400
Albuquerque, NM 87115
505-845-6307

DOE Technology Development Focus Areas

Contaminant Plume Containment
and Remediation:
David Biancosino
U.S. DOE/EM-50
Cloverleaf
19901 Germantown Road
Germantown, MD 20874
301-903-7961

Mixed Waste Characterization,
Treatment, and Disposal:
Tom Anderson
U.S. DOE/EM-50
Cloverleaf
19901 Germantown Road
Germantown, MD 20874
301-903-7295

Radioactive Tank Waste Remediation:
David Geiser
U.S. DOE/EM-50
Cloverleaf
19901 Germantown Road
Germantown, MD 20874
301-903-7640

Landfill Stabilization:
Skip Chamberlain
U.S. DOE/EM-50
Cloverleaf
19901 Germantown Road
Germantown, MD 20874
301-903-7248

Facility Deactivation, Decontamination,
and Material Disposal:

Jerry Hyde
U.S. DOE/EM-50
Cloverleaf
19901 Germantown Road
Germantown, MD 20874
301-903-7914

Points of Contact for Major DOE Installations

Rocky Flats:
John Ahlquist
U.S. DOE/EM-452
Cloverleaf
19901 Germantown Road
Germantown, MD 20874
301-903-5908
301-903-3877 (fax)

Idaho National Engineering
Laboratory:
Paul Strider
U.S. DOE/EM-441
Cloverleaf
19901 Germantown Road
Germantown, MD 20874
301-903-8140
301-903-3675 (fax)

Savannah River:
Hap Thron
U.S. DOE/EM-421
Cloverleaf
19901 Germantown Road
Germantown, MD 20874
301-903-8153
301-903-2461 (fax)

Oak Ridge Reservation:
Rick Nace
U.S. DOE/EM-422
Cloverleaf
19901 Germantown Road
Germantown, MD 20874
301-903-7219
301-903-2747 (fax)

Hanford:
Mary Harmon
U.S. DOE/EM-442
Cloverleaf
19901 Germantown Road
Germantown, MD 20874
301-903-8167
301-903-3675 (fax)

OTHER FEDERAL AGENCIES

Department of Agriculture

Forest Service
Environmental Issues
201 14th Street, SW
Washington, DC 20250
202-205-0957

Agricultural Research Services
Facilities Division
Safety, Health, and Environmental
Management
Branch
6303 Ivy Lane
Greenbelt, MD 20770-1433
301-344-0218

Commodity Credit Corporation
Conservation and Environmental Protection
Division
Post Office Box 2415
Washington, DC 20013
202-720-3467

Farmers Home Administration/Rural
Development Administration
Program Support Staff
Environmental Support Branch
14th & Independence, Room 6309
Washington, DC 20250
202-720-9619

Department of Commerce

U.S. Department of Commerce
Office of Management Support
Environmental Safety & Compliance Division
Room 6020
14th & Constitution Ave, NW
Washington, DC 20230
202-482-4115

General Services Administration

General Services Administration
Safety & Environmental Management Division
Environmental Branch (PMS)
18th and F Streets, NW, Room 4046
Washington, DC 20405
202-708-5236

Department of the Interior

Bureau of Land Management
Public Affairs
Main Interior Building, Room 5600
1849 C Street, NW
Washington, DC 20240
202-208-3435

Bureau of Mines
Division of Environmental Technology
810 7th Street, NW, Mail Stop 6205
Washington, DC 20241
202-501-9271

Bureau of Reclamation
Public Affairs Office
Department of the Interior
1849 C Street, NW
Washington, DC 20240-9000
202-208-4662

National Park Service
Environmental Quality Division
1849 C Street, NW, Room 1210
Washington, DC 20240
202-208-3163

Fish & Wildlife Service
1849 C Street, NW, Room 3447
Washington, DC 20240
202-208-5634

Department of Justice

U.S. Department of Justice
Public Affairs, Room 1216
10th & Constitution Ave., NW
Washington, DC 20530
202-514-2007

National Aeronautics and Space Administration

NASA Headquarters
Environmental Affairs
Washington, DC 20546
202-358-1090

Small Business Administration

Small Business Administration
Office of Litigation, 7th Floor
409 3rd Street, SW
Washington, DC 20416
202-205-6643

Tennessee Valley Authority

Tennessee Valley Authority
Environmental Quality Staff
400 W. Summit Hill Dr., Mail Stop WT 8B
Knoxville, TN 37902
615-632-6578

U.S. Department of Transportation

Federal Aviation Administration
Office of Environment and Energy (AEE-20)
800 Independence Ave., SW
Washington, DC 20591
202-267-3554

U.S. Coast Guard
Environmental Affairs
2100 2nd Street, SW
Washington, DC 20593
202-267-1587

STATE HAZARDOUS WASTE MANAGEMENT PROGRAM OFFICES

Alabama

Land Division
Department of Environmental Management
1751 Congressman Dickinson Drive
Montgomery, AL 36130
205-271-7700

Alaska

Solid and Hazardous Waste Management
Section
410 Willoughby Avenue, Ste. 105
Juneau, AK 99801
907-465-5150

Arizona

Office of Waste Programs/Haz. Sect.
Department of Environmental Quality
3033 North Central Avenue
Phoenix, AZ 85012
602-207-2381

Arkansas

Hazardous Waste Division
Pollution Control and Ecology
P.O. Box 8913
Little Rock, AR 72219
501-562-7444

California

Toxics Substance Control
400 P Street, 4th Floor
P.O. Box 806
Sacramento, CA 95812-0806
916-323-9723

Colorado

Hazardous Materials and Waste Management
Department of Public Health & Environment
4300 Cherry Creek Drive, S.
Denver, CO 80222
303-692-3300

Connecticut

Bureau of Waste Management
Department of Environmental Protection
79 Elm Street
Hartford, CT 06106
203-424-3021

Delaware

Hazardous Waste Branch
Department of Natural Resources and
Environmental Control
P.O. Box 1401
Dover, DE 19903
302-739-4781

District of Columbia

Solid Waste Management
Department of Public Works
2750 S. Capitol Street, SE
Washington, DC 20003
202-767-8512

Florida

Division of Waste Management
Department of Environmental Protection
2600 Blairstone Road
Tallahassee, FL 32399
904-487-3299

Georgia

Environment Protection Division
Department of Natural Resources
205 Butler Street, Ste. 1152
Atlanta, GA 30334
404-656-4713

Hawaii

Solid and Hazardous Waste Branch
Department of Health
500 Ala Moana Blvd., Ste. 150
Honolulu, HI 96813
808-586-4225

Idaho

Permitting & Enforcement
Division of Environmental Quality
1410 North Hilton Street
Boise, ID 83706
208-334-5898

Illinois

Hazardous Waste Center
1 E. Hazelwood Drive
Champaign, IL 61820
217-333-8940

Indiana

Office of Solid & Hazardous Waste
Management
Department of Environmental Management
105 South Meridian Street, Box 6015
Indianapolis, IN 46225
317-232-3210

Iowa

Air Quality and Solid Waste Protection
Department of Natural Resources
900 East Grand Avenue
Des Moines, IA 50319
515-281-8852

Kansas

Bureau of Waste Management
Department of Health and Environment
Landon State Office Bldg, 10th Fl.
Topeka, KS 66612-1290
913-296-1600

Kentucky

Hazardous Waste Branch
Division of Waste Management
14 Reilly Road
Frankfort, KY 40601
502-564-6716

Louisiana

Office of Solid & Hazardous Waste
Department of Environmental Quality
7290 Bluebonnet Rd.
Baton Rouge, LA 70810
504-765-0741

Maine

Oil & Hazardous Materials Bureau
Department of Environmental Protection
State House Station #17
Augusta, ME 04333
207-287-2651

Maryland

Hazardous Waste Program
Hazardous and Solid Waste Management
Admin.
2500 Broening Highway
Baltimore, MD 21224
301-631-3343

Massachusetts

Division of Hazardous Waste
Department of Environmental Protection
One Winter Street, 3rd Floor
Boston, MA 02108
617-292-5574

Michigan

Hazardous Waste Program Section
Department of Natural Resources
P.O. Box 30028
Lansing, MI 48909
517-373-2730

Minnesota

Hazardous Waste Division
Pollution Control Agency
520 Lafayette Road
St. Paul, MN 55155-4194
612-297-8502

Mississippi

Hazardous Waste Division
Department of Environmental Quality
P.O. Box 10385
Jackson, MS 39289
601-961-5062

Missouri

Hazardous Waste Program
Department of Natural Resources
Jefferson Building, 13th Fl.
P.O. Box 176
Jefferson City, MO 65102
314-751-7869

Montana

Hazardous Waste Section
Solid and Hazardous Waste Bureau
Cogswell Building
Helena, MT 59620
406-444-1430

Nebraska

Hazardous Waste Section
Department of Environmental Quality
P.O. Box 98922
Lincoln, NE 68509
402-471-4217

Nevada

Division of Environmental Protection
Capitol Complex
Carson City, NV 89710
702-687-5872

New Hampshire

Hazardous Waste Compliance Section
Waste Management Compliance Bureau
6 Hazen Drive
Concord, NH 03301
603-271-2942

New Jersey

Div. of Responsible Party Site Remediation
Environmental Protection Department
401 East State Street, CN028
Trenton, NJ 08625
609-633-1408

New Mexico

Hazardous Waste Bureau
Department of Environment
P.O. Box 26110
Sante Fe, NM 87502
505-827-4300

New York

Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233
518-457-3446

North Carolina

Hazardous Waste Section
Division of Solid Waste Management
P.O. Box 27687
Raleigh, NC 27065-1350
919-733-2178

North Dakota

Division of Solid Waste Management
Health & Consolidated Labs.
P.O. Box 5520
Bismark, ND 58502-5520
701-328-5166

Ohio

Hazardous Waste Management
Solid & Hazardous Waste Management
P.O. Box 1049
Columbus, OH 43266-0149
614-644-2934

Oklahoma

Hazardous Waste Management Services
Environmental Health Services
P.O. Box 53551
Oklahoma City, OK 73152
405-271-5338

Oregon

Hazardous Waste Policy & Program
Development
Waste & Cleanup Division
811 S.W. Sixth Avenue
Portland, OR 97204
503-229-6585

Pennsylvania

Bureau of Waste Management
Department of Environmental Resources
P.O. Box 2063, Fulton Building
Harrisburg, PA 17120
717-787-9870

Rhode Island

Solid Waste Section
Air and Hazardous Materials Division
291 Promenade Street
Providence, RI 02908
401-277-2797

South Carolina

Bureau of Solid and Hazardous Waste
Management
Department of Health and Environmental
Control
2600 Bull Street
Columbia, SC 29201
803-896-4001

South Dakota

Division of Environmental Regulation
Waste Management Program
523 East Capitol
Pierre, SD 57501
605-773-3151

Tennessee

Hazardous Waste Management Section
Department of Environment & Conservation
401 Church Street, 5th Fl.
Nashville, TN 37243
615-532-0780

Texas

Office of Waste Management
Natural Resources Conservation Commission
P.O. Box 13087
Austin, TX 78711-3087
512-293-2104

Utah

Division of Solid and Hazardous Waste
Department of Environmental Quality
P.O. Box 14880
Salt Lake City, UT 84114-4880
801-538-6775

Vermont

Hazardous Materials Management Division
Agency of Natural Resources
103 South Main Street
Waterbury, VT 05671-0404
802-241-3888

Virginia

Department of Environmental Quality
629 East Main Street
Richmond, VA 23219
804-762-4020

Washington

Office of Waste Management
Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600
360-407-6000

West Virginia

Office of Waste Management
1356 Hansford Street
Charleston, WV 25301
304-348-5393

Wisconsin

Hazardous Waste Management Section
Solid & Hazardous Waste Management Bureau
101 S. Webster, 3rd Fl
P.O. Box 7921
Madison, WI 53707
608-266-7055

Wyoming

Solid & Hazardous Waste Division
Department of Environmental Quality
Herschler Bldg.
Cheyenne, WY 82002
307-777-7753

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APPENDIX F

BIBLIOGRAPHY

BIBLIOGRAPHY

Remediation Trends at National Priorities List (NPL) Sites

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APPENDIX G

DEFINITIONS OF INNOVATIVE TECHNOLOGIES

SELECTED FOR NPL SITE CLEANUPS

INNOVATIVE TECHNOLOGIES SELECTED FOR NPL SITE CLEANUPS

Soil Control Technologies

***Ex Situ* Bioremediation**

This technology uses microorganisms to degrade organic contaminants in excavated soil, sludge, and solids. The microorganisms break down the contaminants by using them as a food source. The end products are typically CO₂ and H₂O. *Ex situ* bioremediation includes slurry-phase bioremediation, in which the soils are mixed in water to form a slurry, and solid-phase bioremediation, in which the soils are placed in an cell or building and tilled with added water and nutrients. Land farming and composting are types of solid-phase bioremediation.

***In Situ* Soil Bioremediation**

With *in situ* bioremediation, an oxygen source and, sometimes, nutrients, are pumped under pressure into the soil through wells, or they are spread on the surface for infiltration to the contaminated material. Bioventing is a common form of *in situ* bioremediation. Bioventing uses extraction wells to circulated air with or without pumping air into the ground.

Contained Recovery of Oily Wastes (CROW™)

This process displaces oily wastes with steam and hot water. The contaminated oils are swept into a more permeable area and are pumped out of the soil.

Cyanide Oxidation

Organic cyanides are oxidized to form less hazardous compounds through chemical reactions.

Dechlorination

Dechlorination is a chemical reaction which removes or replaces chlorine atoms contained in hazardous compounds, rendering them less hazardous.

Hot Air Injection

With hot air injection, heated air is injected and circulated through the subsurface. The heated air volatilizes volatile organic compounds so they can be extracted and captured for further treatment or recycling.

***In Situ* Flushing**

For *in situ* flushing, large volumes of water at times supplemented with treatment compounds, are introduced to the soil, waste, or groundwater to flush hazardous contaminants from a site. Injected water must be isolated effectively within the aquifer and recovered.

Physical Separation

Removes contaminants from a medium in order to reduce the volume of material requiring treatment.

Phytoremediation

Phytoremediation involves the cultivation of specialized plants that are capable of taking up specific soil contaminants into their roots or foliage. Uptake of contaminants by the plants reduces concentrations of contaminants in the soil. Periodic harvesting of the plants may be necessary.

Plasma High Temperature Metals Recovery	This technology is a thermal treatment process that purges contaminants from solids and soils as metal fumes and organic vapors. The organic vapors can be burned as fuel and the metal fumes can be recovered and recycled.
Soil Vapor Extraction (SVE)	This technology removes volatile organic compounds from the soil through the use of vapor extraction wells, sometimes combined with air injection wells, to strip and flush the contaminants into the air stream for further treatment.
Soil Washing	Soil washing is used for two purposes. First, the mechanical action and water (sometimes with additives) physically remove the contaminants from the soil particles. Second, the agitation of the soil particles allows the more highly contaminated fine particles to separate from the larger ones, thus reducing the volume of material requiring treatment.
Solvent Extraction	Solvent extraction operates on the principle that, in the correct solvent, organic contaminants can be solubilized preferentially and removed from the waste. The solvent to be used will vary, depending on the waste type.
Thermal Desorption	For thermal desorption, the waste is heated in a controlled environment to cause organic compounds to volatilize from the waste. The operating temperature for thermal desorption is less than 1000°F (550°C). The volatilized contaminants will usually require further control or treatment.
Vitrification	Vitrification melts contaminated soil in place at temperatures of approximately 3000°F (1600°C). Metals are encapsulated in the glass-like structure of the melted silicate compounds. Organics may be treated by combustion.

Groundwater Treatment Technologies

Air Sparging	Air sparging involves injecting air or oxygen into the aquifer to strip or flush volatile contaminants as the air bubbles up through the groundwater and is captured by a vapor extraction system. The entire system acts as an <i>in situ</i> air stripper. Stripped or volatilized contaminants usually will be removed through soil vapor extraction wells and usually require further treatment.
In Situ Groundwater Bioremediation	With <i>in situ</i> bioremediation, which is often combined with air sparging, nutrients or an oxygen source (such as air) are pumped under pressure into the aquifer through wells to enhance biodegradation of contaminants in the groundwater.

Dual-Phase Extraction	Dual-phase extraction removes contaminants simultaneously from both the saturated and the unsaturated zone soils <i>in situ</i> . This new technology applies soil vapor extraction techniques to contaminants trapped in saturated zone soils, which are more difficult to treat than are those in the unsaturated zone. In some instances, this result may be achieved by sparging the groundwater section of a well that penetrates the groundwater table. Other methods also may be employed.
<i>In Situ</i> Oxidation	This technology oxidizes contaminants that are dissolved in groundwater, converting them into insoluble compounds.
Passive or Permeable Treatment Walls	Passive treatment walls act like chemical treatment zones. Contaminated groundwater comes into contact with the wall, which is permeable, and a chemical reaction takes place. Limestone treatment zones increase the pH, which effectively immobilizes dissolved metals in the saturated zone. Another type of passive treatment wall contains iron filings that dechlorinate compounds.
Surfactant Flushing	Surfactant flushing of non-aqueous phase liquids (NAPL) increases the solubility and mobility of the contaminants in water, so that the NAPL can be biodegraded more easily in the aquifer or recovered for treatment aboveground via a pump-and-treat system.

APPENDIX H

ACRONYMS

Acronyms

AFBC	Air Force Base Conversion Agency
ANPRM	Advanced Notice of Proposed Rulemaking
ARCS	Alternative Remedial Contracting Strategy
ASTSWMO	Association of State and Territorial Solid Waste Management Officials
ATTIC	Alternative Treatment Technology Information Center
BFSS	Bioremediation in the Field Search System
BLM	Bureau of Land Management
BRAC	Base Realignment and Closure
BCP	BRAC Cleanup Plan
BCT	BRAC Cleanup Team
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CA	Cooperative Agreement
CAMU	RCRA Corrective Action Management Unit
CBO	Congressional Budget Office
CERFA	Community Environmental Response Facilitation Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund)
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CFR	Code of Federal Regulations
CMI	RCRA Corrective Measures Implementation
CMS	RCRA Corrective Measures Study
CORA	Cost of Remedial Action Computer Model
CRDA	Cooperative Research and Development Agreement [DOE]
D&D	Decontamination and Decommissioning
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DERPMIS	Defense Environmental Restoration Program Management Information System
DLA	Defense Logistics Agency
DOD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOI	U.S. Department of Interior
DOJ	U.S. Department of Justice
DOT	U.S. Department of Transportation
DSMOA	Defense and State Memorandum of Agreement
EBS	Environmental Baseline Survey
EC	Enterprise Community
EPA	U.S. Environmental Protection Agency
ERCS	Emergency Remedial Contracting Strategy
ERMC	Environmental Restoration Management Contractor [DOE]
ESTCP	Environmental Security Technology Certification Program
EZ	Empowerment Zone
FR	Federal Register
FUDS	Formerly Used Defense Sites
FUSRAP	Formerly Utilized Sites Remedial Action Program
FY	Fiscal Year
GAO	U.S. Government Accounting Office

Acronyms (continued)

GENSUR	National Survey of Hazardous Waste Generators
GWRTAC	Groundwater Remediation Technologies Analysis Center
HRS	Superfund Hazard Ranking System
HSWA	Hazardous and Solid Waste Amendments of 1984
HWIR-Media	Hazardous Waste Identification Rule - Media
HUD	U.S. Department of Housing and Urban Development
IAG	Interagency Agreement
IRP	Defense Installation Restoration Program
LDR	RCRA Land Disposal Restrictions
LTTD	Low Temperature Thermal Desorption
MUDSS	Mobile Underwater Debris Survey System
NAPL	Nonaqueous Phase Liquid
NASA	National Aeronautics and Space Administration
NAVFAC	Navy Facilities Engineering Command
NCAPS	National Corrective Action Priority Ranking System
NCEPI	National Center for Environmental Publications and Information
NCP	National Oil and Hazardous Substances Contingency Plan
NETAC	National Environmental Technologies Applications Center
NTIS	National Technical Information Service
NPL	Superfund National Priorities List of Hazardous Waste Sites
O&M	Operation and Maintenance
OU	Operable Unit
ORD	Office of Research and Development
OSW	Office of Solid Waste
OSWER	Office of Solid Waste and Emergency Response
OTA	Office of Technology Assessment
PA	Preliminary Site Assessment
PAH	Polynuclear Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PCE	Perchloroethylene
PRDA	Program Research and Development Announcement [DOE]
PEIS	Programmatic Environmental Impact Statement [DOE]
POL	Petroleum, Oil, and Lubricants
POTW	Publicly Owned [wastewater] Treatment Works
PRP	Potentially Responsible Party
RA	Remedial Action
RAB	Restoration Advisory Board
RAC	Remedial Action Contractor
RACS	Remedial Action Contracting Strategy
RCRA	Resource Conservation and Recovery Act of 1976
RCRIS	Resource Conservation and Recovery ACT Information System National Oversight Database
RD	Remedial Design
RD&D	Research, Development, and Demonstration
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation

Acronyms (continued)

RFP	Request for Proposals
RI/FS	Remedial Investigation/Feasibility Study
RIA	Regulatory Impact Analysis
RIS	RCRA Implementation Study
RMIS	DOD's Restoration Management Information System
ROD	Record of Decision
RP	Responsible Party
RPM	Remedial Project Managers
RTC	Resolution Trust Corporation
RTDF	Remediation Technologies Development Forum
NTIS	National Technology Information System
RU	RCRA Regulated Unit
SACM	Superfund Accelerated Cleanup Model
SARA	Superfund Amendments and Reauthorization Act of 1986
SBA	Small Business Administration
SBIR	Small Business Innovative Research Program
SERDP	Strategic Environmental Research and Development Program
SI	Site Inspection
SITE	Superfund Innovative Technology Evaluation Program
SVE	Soil Vapor Extraction
SVOC	Semivolatile Organic Compound
SWMU	Solid Waste Management Unit
TCE	Trichloroethylene
TIO	Technology Innovation Office
TPS	Third Party Site [DOD]
TSD	Treatment, Storage, or Disposal
TSDF	Treatment, Storage, or Disposal Facility
TSDR	Treatment, Storage, Disposal, or Recycling Facility
UIC	Underground Injection Control
UMTRA	Uranium Mill Tailings Remedial Action Project
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center
USATHAMA	U.S. Army Toxics and Hazardous Materials Agency
USDA	U.S. Department of Agriculture
UST	Underground Storage Tank
VISITT	Vendor Information System on Innovative Treatment Technologies
VOC	Volatile Organic Compound
WPB	War Production Board